NATIONAL PHYSICAL MASTER PLAN OF THE LEBANESE TERRITORY

NPMLPT

FINAL REPORT

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The decree-law 5/77 dated January 31, 1977, creates and sets the duties of the Council for Development & Reconstruction (CDR). Article 3 of this Decree–Law requires CDR to establish “the general framework for urban planning orientations” in Lebanon and submit it to the Council of Ministers for approval.

Based on this legislative arrangement, the Government has made CDR in charge of elaborating, not only the framework for urban planning policy, but also a physical Master Plan that will constitute the basis for urban planning policy. The plan will also serve as a guideline for all stakeholders participating in the national and land use development, starting with public bodies, administrations and autonomous offices.

The recommendations of this study for the urban planning sector, as decreed by the Council of Ministers, will be imposed, among others, on local urban planning master plans that will be elaborated or reviewed afterwards. In fact, Article 4 of Decree-Law 69/83, dated September 22, 1983 and related to Urban Planning, has foreseen that these local master plans should be elaborated “in the framework of a national land use master plan”.

This conformity of local plans would be accomplished progressively. The plans that are in force will continue to be in use, until they are reviewed; after which, they will be redesigned in accordance with the “guidelines of urban planning” that were defined by the Government, and for which the present National Physical Master Plan provides the philosophy and the general consistency.
INTRODUCTION
BASICS OF THE LAND USE MASTER PLAN

National land, a collective heritage

The national territory is the collective heritage of the Lebanese people. Every generation has thus the duty to transmit it, in its entire wealth, to future generations, after using it rationally and developing it in a way that would not affect its character or its potential.

It is the duty of the State to define national policies and adopt means to protect the national territory, preserve its fundamental characteristics, secure the permanence of its natural exploited wealth, as well as to promote a harmonious and sustainable economic and social development.

Citizens and local collectivities have the duty to use the territory in a respectful, economic, intelligent and reasonable manner, within a spirit of nationalism and continuously being conscious and accounting for national imperatives and the judgment of future generations.

It is within this spirit that the National Physical Master Plan (NPMP) defines the principles of developments for various regions as well as the basics of the usage of territory for all areas. It also proposes facilities and sites of planned activities, specifying their objectives, dimensions and locations.

Organization of living and working in a small country

In an article dated August 21, 1945, the Lebanese philosopher Michel Chiha had written: “In our country, with lack of precaution, we risk to be more and more cramped... Here, it is important to remember that all we have is some ten thousand square kilometers... Whether it is the Beqaa valley or the coastal zone, North or South, or even the historical range of our ancient coastal cities, we should get organized so that nothing gets ignored, in order to maintain the land heritage, of which geography and history have given us our share... One of the Lebanese Government concerns should be issues such as population density and land use. We can turn Lebanon not only into a welcoming host country, but also encompassing all its children. This implies then establishing a special section of the political and administrative activity, or even a permanent institution that works continuously on data collection, project planning and project analysis...”.
At the time when these words were written, Lebanon’s population was only one million people; today, there are about four million people. Thus, the necessity for the Lebanese people to organize their “slightly more than ten thousand square kilometers” ¹ is much more vital.

It is always necessary to remember that Lebanon is amongst the ten most densely populated countries in the world. This has a significant impact on the use of its non-renewable resources, whether it is its coastal areas, its landscapes or its natural as well as constructed heritage.

Therefore, issues of civic responsibility and respect of collective rules and regulations become of particular importance, evolving and growing with the growth of the population.

The Lebanese people must take into consideration the change in scale resulting from the transition from a country of one million inhabitants during the independence to a country of four million inhabitants in the year 2000, living in the same area, and expected to exceed a number of five millions in two or three decades.

The conservation of the quality of life specific to Lebanon depends on such consciousness.

**A scheme for a greater freedom of choice and action**

Freedom in Lebanon has such a distinguished place that some associate it with the air that the Lebanese breath. Freedom probably represents the main component in what constitutes the “quality of life” that distinguishes the Lebanese society. Nevertheless, it is this freedom that is declining in all domains: freedom of belief, opinion, expression, traditions, economics, free enterprise, independence and national sovereignty…

Lebanese land-use management has to encourage all forms of freedom by broadening the choices of housing and investment for all the country, in the frame of a civic rather than constrained project.

The first enemy of freedom is anarchy. Some people’s freedom can be diminished by isolated non-civic behaviors and acts. Therefore, a minimum of order and a minimum of directives and regulations are necessary to organize collective life. Such regulations should be as simple as possible, but at the same time very essential, particularly in a small country as densely populated as Lebanon.

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¹ It is remarkable that an intellectual with liberal aspirations like Michel Chiha had thought about a planning institution, responsible for “continuous projects and statistics”, a mission entrusted first to the Ministry of Planning, then to the Council for Development and Reconstruction.
The second enemy of freedom consists of barriers and partitioning. Lebanon has marked in its Constitution its commitment to free economy, but more efforts are necessary in order to achieve it. Effectively, an open economy is free of all kinds of partitions and obstacles to free competition. The National Physical Master Plan should open the regions to one another and promote trade, set up of companies, as well as free movement of all goods in the entire territory.

There was a time when most Lebanese regions were open to Lebanese people of all origins. That was a time where people spent their holidays in any village of their choice; a time when retired persons used to live in a village of their choice, even if they were not originally from that village; a time when employee assignments, in public as well as private sectors, used to have them relocate to any other part of the country, without it being an issue.

It would be beneficial to return to that model of integration, by giving the Lebanese people the freedom to choose their place of residence, as mentioned in the Lebanese Constitution.

This requires voluntary actions to open the regions to one another to revitalize them economically, socially and culturally, in order to serve inhabitants of the most deprived regions, which constitute today’s most “closed” regions.

It is also in Lebanon’s interest to widen the range of choices offered to national, Arab or foreign productive investments (in terms of setting up companies) on the territory. It is the national, as well as, the economic and social interests that call for this. This diversification of choices is done through the valorization of all cities and regions of the country, in order to de-concentrate investments, and through a series of convergent actions that strive for an “open territory”.

**Objectives of the Land management policy**

There is a strong consensus within the Lebanese society as far as land management policy objectives are concerned. This consensus is developed around common objectives and values, part of which is written in the Constitution.

Thus, this land management policy must reinforce:

- The unity of the country (a constitutional principle);
- Equitable development of regions (a constitutional principle);
- Optimal and sustainable use of natural resources, particularly water resources;
- Decrease of public debts and expenses;
- Improvement of productivity and economic growth;
− A better balance in external exchange (trade);
− Social development and improvement in quality of life;
− Protection of environment;
− Conservation of heritage…

These objectives set the outline of an “ideal” future that is easy to imagine: a prosperous and united Lebanon that respects and properly uses its resources and its heritage, rationalizes its public expenditures and ensures collective services of high quality.

The National Physical Master Plan follows the above-mentioned objectives, taking into consideration the realities of today and the challenges of the future. From this confrontation between hopes and reality emerges 3 basic choices that the plan bases itself on:

- Unity of the country
- Balanced development
- Rationalization of uses of resources

− Land management should effectively promote unity of the country, and should promote the economy for the benefit of society. This promotion is a major necessity in order to deal with economic and social challenges that the country is facing and will face.

− Land management should lead to alleviate the disparities of development between regions by implementing a modern and objective perception of a fair and equitable development principle.

− Land management should seek a rational use of the limited resources, specifically natural resources and public funds.

These 3 basic choices govern the entire perspectives adopted on the spatial level, whether it is the specification of soil vocations, the proposed urban structure, the development projects for various regions, the orientations in the field of public transport and facilities, the management of urban planning and urban development, and natural zones or heritage administration.

The current report describes in details the approach that has led to the adopted choices and specifies the emerged orientations. This document is therefore a major component of the National Land Use Master Plan, as are the attached maps.
### Table 1: Lebanon: some key data

<table>
<thead>
<tr>
<th>Category</th>
<th>Year</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resident population</td>
<td>1997</td>
<td>4,005,000</td>
</tr>
<tr>
<td>Number of buildings</td>
<td>1996</td>
<td>520,000</td>
</tr>
<tr>
<td>Number of dwellings</td>
<td>1996</td>
<td>1,000,000</td>
</tr>
<tr>
<td>Number of companies</td>
<td>1996</td>
<td>200,000</td>
</tr>
<tr>
<td>% of dwellings in the Central Urban Area</td>
<td>1996</td>
<td>42 %</td>
</tr>
<tr>
<td>% of dwellings in 9 other large agglomerations</td>
<td>1996</td>
<td>21 %</td>
</tr>
<tr>
<td>% of dwellings in the rest of the country</td>
<td>1996</td>
<td>37 %</td>
</tr>
<tr>
<td>Road network length</td>
<td>2000</td>
<td>Km: 22,000</td>
</tr>
<tr>
<td>Beirut Airport terminal capacity</td>
<td>2003</td>
<td>Millions of passengers / year: 6</td>
</tr>
<tr>
<td>Beirut Airport runways capacity</td>
<td>2003</td>
<td>Millions of passengers / year: 16</td>
</tr>
<tr>
<td>Number of commercial ports</td>
<td>2003</td>
<td>5</td>
</tr>
<tr>
<td>Total merchandise in Port of Beirut</td>
<td>2001</td>
<td>Tons: 5,000,000</td>
</tr>
<tr>
<td>Total merchandise in Port of Tripoli</td>
<td>2001</td>
<td>Tons: 700,000</td>
</tr>
<tr>
<td>Number of industrial ports</td>
<td>2003</td>
<td>7</td>
</tr>
<tr>
<td>Number of fishing harbors and marinas</td>
<td>2003</td>
<td>32</td>
</tr>
<tr>
<td>Length of the footprint of the old railway</td>
<td>2003</td>
<td>Km: 400</td>
</tr>
<tr>
<td>Number of electric power plants</td>
<td>2003</td>
<td>30</td>
</tr>
<tr>
<td>Electric power plants nominal capacity</td>
<td>2003</td>
<td>MW: 2,300</td>
</tr>
<tr>
<td>Electric energy need</td>
<td>2002</td>
<td>MW: 1,700</td>
</tr>
<tr>
<td>Electric energy production</td>
<td>2001</td>
<td>GWH: 9,437</td>
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<td>Installed fix telephone lines</td>
<td>2001</td>
<td>Primary pairs: 1,730,000</td>
</tr>
<tr>
<td>Hydraulic structures</td>
<td>2001</td>
<td>29 + 1 dam</td>
</tr>
<tr>
<td>Water reservoirs storage capacity</td>
<td>2001</td>
<td>Mm³: 251 of which 200 on Litani</td>
</tr>
<tr>
<td>Operational domestic water treatment plants</td>
<td>2002</td>
<td>12</td>
</tr>
<tr>
<td>Water treated in plants before distribution</td>
<td>2002</td>
<td>Mm³ / year: 200</td>
</tr>
<tr>
<td>Distributed water by simple chlorination</td>
<td>2002</td>
<td>Mm³ / year: 100 to 200</td>
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<tr>
<td>Number of building wells</td>
<td>1996</td>
<td>45,000</td>
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<td>Number of protected sites / monuments (DGA)</td>
<td>2002</td>
<td>500</td>
</tr>
<tr>
<td>Number of sites inscribed as UNESCO heritage</td>
<td>2002</td>
<td>6</td>
</tr>
</tbody>
</table>
UNCONTESTED PHYSICAL FEATURES
CHAPTER I

UNCONTESTED PHYSICAL FEATURES

The basic choices adopted in the National Physical Master Plan of the Lebanese Territories (NPMPLT) are the result of a coherent analysis of two imperatives:

- Physical data (constraints and advantages) that characterize the Lebanese territory; and

- Challenges of the future, in terms of economic and social perspectives.

The present chapter explains the imperatives followed by physical features.

I.1 THE SIZE OF LEBANON AND ITS GEOGRAPHIC LOCATION

The first unavoidable feature or reality of Lebanon is its small surface area. With less than 11000 km$^2$, it is the second smallest country in the Middle East and the Arab World (after Bahrain). Its territory represents 1 / 1000$^\text{th}$ that of large countries such as the USA or Canada and 1 / 100$^\text{th}$ that of Egypt.

Despite the fact that it is densely populated\(^1\), it is ranked 125$^\text{th}$ worldwide for its populations, with four million inhabitants\(^2\).

Its well-known and exploited natural resources consist practically of water resources, soil and vegetation, as well as climate and landscapes.

The small size of the country, its population density and the modesty of its natural resources generate a series of perennial consequences, the most important being the vital necessity for Lebanon to be open to the whole world in order to import resources and consumption goods on one hand, and export goods and services, on the other.

This tendency of openness to the outside world, an objective to every small country, is an old reality for Lebanon, where it has taken different shapes with time: trade with cities of the Mediterranean basin, business with Egypt and Greece, demographic expansion towards fertile hinterlands, and exchanges with cities of Syria, Palestine, Iraq and the Gulf States. It has also led to numerous emigrations since the mid-19\textsuperscript{th}

\[^1\] Among countries of more than one million people, Lebanon comes on the 11$^\text{th}$ position as far as population density is concerned (number of inhabitants per km$^2$).

\[^2\] Source: Central Administration for Statistics (CAS), 1997
century that has resulted in a large Diaspora throughout the entire planet... This openness of the country has been facilitated by its geographic location, at the threshold of Europe, Africa and the Middle East.

The sea and the air connect Lebanon with the entire world. On the other hand, its terrestrial pathways go necessarily across Syria, ever since the closure of the southern border in 1948.

Intense trade, economic dynamism as well as cultural activities highlight Lebanon’s international openness.

In the future, this openness will progressively increase because of an inexorable movement of globalization and collapse of custom barriers, integration of local economies into regional and international economies, as well as decrease of transportation costs for people and goods.

This openness as well as recent emigration flows lead, among other things, to important financial flows coming from abroad in the form of deposits in the Lebanese banks.

One of the major challenges for Lebanon is to maintain control over capitals, without losing its interior productive capacity. This balance is hard to maintain while external income (when spent to finance local consumption) has the side effect of raising internal prices and production costs, reducing local products competitiveness and hindering exportation. The solution resides probably in the capacity of Lebanon to reorient the surplus of these incomes more in productive investments and less in consumption.
Lebanon in the World and the Middle East

\(\text{n}^\text{o}.1 : \text{Lebanon in the World}\)

\(\text{n}^\text{o}.2 : \text{Lebanon in the Middle-East}\)
1.2 TOPOGRAPHY, AN IMMUTABLE FACT

Topography is an unavoidable, distinguished and at the same time restricting feature of Lebanon. The mountains of Lebanon have shaped its climate, water resources, landscapes and extremely rich biodiversity. They had always played a decisive role in the history of its settlements and still are to date.

A place to live: It has always been difficult in Lebanon to settle beyond an elevation of 1500 meters, and all kinds of permanent dwellings are absent beyond 2000 meters. Settlement densities in Lebanon will remain in disparity according to elevation, with consecutive levels roughly at 400 meters, 1000 meters and 1500 meters. Topography generates more or less steep slopes as well: constructions rarely set up on slopes higher than 30%, and practically never on slopes higher than 40%.

Agriculture: Topography is a determining factor – besides nature of soils, irrigation and water availability – for possible crop types and agricultural techniques. Elevation levels avail Lebanon of the possibility to develop an extremely diverse agriculture, from quasi-tropical produce in coastal plains up to orchards in high altitude, with a full range of possible intermediary products in between. Physical configurations of terrains (vast plains, narrow plains, basin, slopes, etc.) determine the possibilities for automation (mechanization) and industrial and semi-industrial exploitation.

Biodiversity: Elevation levels – together with slope exposure – provide Lebanon with exceptional biodiverse conditions that are a great richness not only for the country, but also to humanity. Preservation and protection of biodiversity is in fact an essential equilibrium for life and nature, as well as for research projects, especially in the medical field.

Landscapes: Topography has granted Lebanon its magnificent landscapes (mountains, valleys, cirques, plains, etc.), which constitute a main element of its touristic potential and its distinguishing quality of life. Besides these great scenes of landscape, there are other features created due to geomorphological accidents (cliffs, peaks, canyons, etc.) that are also outstanding and impressive.

Compartments: Topography splits the territory into geomorphological regions, separated by valleys and mountains. It enhances, thus, diversity of the environment, but does constitute physical obstacles to the regions at the same time.

Constraints and infrastructures: Topography imposes its constraints on construction and infrastructure. Contraventions have a high cost and inflict eyesores, such as road embankment fills and dumping or multi-level quarries of high altitude, on the openly visible landscapes.
Importance of Relief and Geomorphology

The topography is an essential feature to take into consideration in land use planning.

The spectacular topographic features of Lebanon take part in defining climatic and agricultural zones, and forest land categories, in dividing lands and imposing constraints (slopes, obstacles) for construction, roads and railway networks and in creating great landscape scenes.

n° I.3 : Topographic Features

n° I.4 : Schematic Topographic Section
Figure I.5: Population Densities per Morphological Zones
I.3 FAVORABLE AREAS FOR AGRICULTURE

One of the immutable realities of Lebanon is its agricultural resources, developed successively by thousands of generations in concordance with continuously advanced techniques.

Until the mid-19th century, agriculture techniques remained rudimentary, and soil productivity was hardly enough to feed a basically rural and deprived population. Peasants in Lebanon have cultivated every land they could (except those necessitating efforts out of reach of men and animals), including lands with poor productivity and lands located on steep slopes. During the 20th century, the agricultural sector faced successive moments of crises, mainly due to decrease of produce values (prices), whether it is natural silk, wheat or more recently apple produce.

Today, techniques have improved, productivity has increased, but once again Lebanese agricultural production suffers from international competition, in front of which, it is facing a series of handicaps: high cost of imported inputs, undersized exploitations, high prices of land, disorganization of production and marketing, weak in innovative research, modesty of agricultural training and extension, poor irrigation techniques, lack of irrigation water in some regions, etc.

In fact, the portion of agriculture and livestock farming in Lebanon’s GDP barely exceeds 6% (national accounting, 1997), which is equivalent in global value to slightly more than US$ 1 billion. The output per hectare is around US$ 3000.

But current difficulties should not lead to condemning any promising future for the agricultural sector in Lebanon. Future generations will surely need agricultural lands for their economy and for their own consumption.

Lebanon is endowed with a significant capital of valuable lands for agriculture. Agricultural value of lands depends on the nature of soils, depth, content of organic material, acidity, water-retaining capacity, landslide and erosion hazards exposure and slope – which determine how easy soils are cultivated with quasi-industrial techniques.

Almost half of Lebanon’s total surface could be cultivated, although with different productivity. The country’s real wealth resides in some large entities, representing altogether around one third of its total surface.

The most productive and important entities have been plotted on maps. They represent practically all the plains (Beqaa, Akkar, Koura, coastal plains, Sour plain, Sarafand, Saida, Marjayoun plain, etc.); higher Shouf fertile lands, corridors of Hasbaya and Rachaya, basin sites of South Lebanon and orchard levels of Mount Lebanon.
Major Agricultural Domain Mapping Method

- **L6**: Soil Map
- **L7**: Slopes
- **L8**: Current Use of Agricultural Lands
- **L9**: Irrigation Projects
Figure 1.10: Agricultural Domain of National Interest
I.4  DISTINGUISHED NATURAL AREAS AND LANDSCAPES

Topography, waterways and climatic zones have constituted massive landscapes that form Lebanon’s identity. They have played a determining role for the biodiversity that characterizes the country and created extraordinary sites as per aspect and scarcity.

Ecological heritage

Lebanon is characterized by its large diversity of ecosystems, due to its variety of environmental conditions (climate, elevation, slope, sun exposure, soil, etc.). A small country such as Lebanon is lucky to have such a large diversity of fauna and flora.

Biodiversity conservation is a major issue for the protection and survival of every species, because of interrelations between ecosystems (no isolated system can survive indefinitely). Mankind benefits from this, whether directly through a better environment quality and nature based tourist activities or indirectly through scientific use of fauna and flora species in medical and pharmaceutical research.

Pollution and sudden ruptures in the environment therefore threaten the ecosystem biodiversity in Lebanon. Hence, it becomes more vital and urgent to restore natural continuities between the different ecosystems by creating a true national ecological network.

Major landscapes in Lebanon

Landscapes are an important factor of tourist attraction in Lebanon and to the quality of life. They represent therefore an economic as well as a social asset.

Among the most important landscapes of Lebanon, some are visible with all its grandeur from a distance: peaks (Qornet es-Saouda, Sannine, Barouk, Hermon), agricultural large plains (Beqaa, Akkar, Koura, etc.), great deep valleys (Abou Moussa, Qadisha, Ibrahim, Litani at Khardali, etc.), picturesque valleys (Jaouz, el-Kalb, Beirut, Barouk – Bisri – Awali, Aassi, Hasbani, etc.), important bays (Jounieh), forests of the North and pine forests of the Cazas of Kesrwan, Baabda, Matn and Jezzine, hills of the South, Qaraoun lake.

Others are visible from a closer range: outstanding coastal sites (Salinas of Enfeh, Ras ech-Shaqqaa, Grotte aux Pigeons, Ramlet el Bayda, Damour plain, gorges and mouth of Litani, seashore of Sour, cliffs of Bayyada and Naqoura), Cedar forests (Sir, Jaje, Becharre, Tannourine, Laqlouq, Falougha, Barouk, Chouf), smaller valleys and interior plains (Kfarhalda, Safa, Qammouaa...), etc.

Main landscapes should be a part of a general policy. In some cases, these big landscapes could be turned into “regional natural reserves” (environmentally friendly...
regions) to be managed and preserved, and economically developed within a long-term plan of action.

**Geologic heritage**

Moreover, Lebanon has a remarkable geological heritage of karst formations and valuable fossil deposits.

Cenomanien fossil deposits (-100 million years) of Jbayl offer numerous relics of significant conservation of fishes and invertebrates of international scientific interest. There are, as well, other fossil deposits of minor importance.

Karst morphology is rich and diverse: striated sculpture relief of Feytroun, artesian springs of Afqa, or underground rivers and grottos such as Jeita or Antelias. There are many more amazing sites: Tourza folds, Faqra natural bridge, Balaa gorge, Jeita grotto, etc.

These sites must be subject to gradual measures of protection, having a primary perimeter (severe protection) and secondary perimeter (prospect preservation, etc).
Figure 1.11: Sites and Landscapes

Legend
- Natural Areas
  - Valleys, Gorges, Summits
  - Slope Slopes, Edges of Ridges
  - Rare Geomorphological Sites
- Cliffs
- Particular Natural Site
- Cascade
- Grates, Sinks

- Remarkable Agricultural Sites
  - A. Agricultural Plane of the Bekaa
  - B. Akkar Plains
  - C. Hills of the South Terraces
  - D. Olives Grove of H FOREIGN

- Baptisms and Natural Sites
  - Picnic Site Villages
    - Main Historic Sites and Their Neighborhoods

Regional Identifiers: Cultural Identifiers
- 1. Region of Hermel
- 2. Region of Hermel, 100 Villages
- 3. Coastal Cultural and Historic Scenery

Coastal Landscape
- Natural Areas
- Built-up and Natural Areas
- Exceptional Coastal Scenery

Cities Outline
- Urban Corridors
- Existing Natural Reserves
- Existing Urban Areas

Sources: AAI / IAUURIF / Landsat Satellite Images - IRS (1998) / Guides / Associations / Aerial photos / Lebanese club of speleology
Processed by: DAR / IAUURIF / MD & EO / LEOC / CNRS (2002)
Methodology for Mapping Areas of Natural Vocation
Figure 1.15: Natural Domain of National Interest
Protected natural sites in 2003

Present protected natural sites are composed of 7 categories:

1- Sites protected by Decree n° 343 dated March 28, 1942 (amended by Decree n° 836 of 09/01/50), based on the Law of July 8, 1939 related to the protection of natural landscapes and sites. 8 sites are protected by this decree: Becharre Cedars, Deir el-Qalaa, Bois de Boulogne, Sindiane el-Mrouj, Horsh Beirut, Yammouneh lake, natural bridge of Nabaa el-Laban and the antique ruins of Baalbeck. Protection consists of zoning regulation on construction rights as well as prospect regulations.

2- Sites protected by the Laws voted by the Parliament between 1992 and 1999 in the framework of “Mahmiyyat” (protected natural reserves). There are 7 sites protected by these laws: Machaa’ Horsh Ehden; Palm Island – Ramkine – Sanai; Chouf cedars; Coast of Tyr; Tannourine cedars; Bentaël; Yammouneh. Altogether, they represent a surface area of around 200 km², that is roughly 2 % of the Lebanese territory. The most important of them is that of Chouf, with a surface area of around 160 km². In general, these sites are located on M’shaa lands, public domain or State owned lands, and protection consists of forbidding construction, quarries, cutting of trees and grazing.

3- Sites protected by Decisions from the Ministry of Environment (MoE), based on the law on natural sceneries and sites of 1939, Decree 9501 dated November 7, 1996 and Article 12 of Law 667 dated December 29, 1997. Sites protected by these decisions are: first, river beds (Nahr Ibrahim; Nahr Jaouz; Nahr el-Kalb and its tributaries Sannine-Salib-Msann; Nahr ed-Damour and all its tributaries starting from Nabaa es-Safa; Nahr Beirut and its tributaries in both valleys; Nahr Awali – including Barouk and Bisri; Nahr Aarqa and its tributaries; Nahr el-Aassi); second, forests located mainly in Chouf (Aïn el Haour, Darayya, Debbiyeh, Bourjeïn, Sheikh Osman, Deîr Moukalhalles, Ain ou Zayn, Dalhoun, Wadi al-Mal, Kafra, Wadi Aghmid, Wadi Ain Baal); then the highland site of Jabal Makmel with its peak Qornet es-Saouda starting from 2400 m up until the peak and finally a series of remarkable natural sites (Karm Shbat, valley of Qadisha, Qammouaa plateau, valley of Qaraqir, Baatara gorge). River protection consists in general of a 1000 m wide zone following the centerline of the river, within which all activities are subject to MoE authorization. This zone extends to 3000 m for the authorization of quarries. The perimeter of protection of forests forbids construction, quarries, cutting of trees and grazing.


5- Sites protected by Decisions from the Ministry of Agriculture prior to 1996 law based on Law 558, dated July 24, 1996, protecting coniferous woods and forests on
the *M’shaa* and public properties. Sites protected by these decisions are: Bezbina (Akkar), Qammouaa (Akkar), Soueyssa (Hermel), Cedars (Besharre), Tannourine, Hadath el Jebbe, Jaje, Karm Shbat (Akkar), Qnat, Merbyn Wadi Jhannam, Qariet es-Safina (Akkar), Jurd en-Njas – Jabal el-Arb’ine – Danniyeh, Ain Qlaïlat – Karm el-Mahr, Qornet el-Kaïf, Mashaa, Shalout, Danniyeh (North), and Bkassine-Jezzine (Jezzine). Protection consists of preserving forests from construction, cutting of trees, grazing, excavations, camping, etc. within a radius of 500 m.

6- Sites protected by Decrees related to urban planning. These decrees are proposed by the General Directorate of Urban Planning (GDUP) after notification by the Higher Council for Urban Planning (HCUP). Protection consists of severe regulations on construction, in the frame of a land use master plan or a specific urban planning document. Most of these general plans, especially those decreed recently, stipulate zones with limited constructability. Among the specific decrees, the decree for the protection of Nahr Damour valley is worth mentioning.

7- Natural sites protected by registration on the World Heritage record of UNESCO: Valley of Qadisha and Cedars of Besharre, both registered in 1998. This registration does add to the protection provided by the local legislation. It has a moral commitment and motivates creation of plans for protecting and benefiting from these zones.

**Unprotected or Poorly Protected Natural Sites**

Many sites, with insufficient protection, could be integrated in the “*Mahmiyyat*” regime. For example, Karm Shbat and Qammouaa. Other remarkable sites, such as Ras Shaqaa, are deprived of any protection and should be integrated in the “*Mahmiyyat*” category.

Swamp sites should be protected as well under the Ramsar Convention, which is ratified by Lebanon. Aammiq marshes (protected at present by the owners of the site) and Ras el-Aïn are future sites to be included under this convention.

Other decisions of protection of Cedar, Juniper, Cyprus and Oak forests of *M’shaas* and public properties (Law 558 dated July 24, 1996) could be considered as well, when delimitation on cadastral plans is completed.

It is also necessary to protect remarkable geologic heritage, particularly grottos, caves, fossil fields, natural bridges, etc.
Figure 1.16: Protected Natural Reserves and Grottos
I.5 THE LEBANESE COASTAL ZONE: POTENTIAL AND CHARACTERISTICS

The Lebanese coastal zone, in its scientific meaning, comprises almost one third of the territory, including the west side of Mount-Lebanon between 0 and 800 meters in altitude, as well as vast zones of North and South Lebanon. But in the context of this study, it is only a narrow sea-land corridor with an altitude between 0 and 50 m.

A narrow coastal plain characterizes this zone, except in the North and South. The coastline is excessively cut and is marked with a series of rocky promontories (Ras), the most important of which is Ras Beirut. Linear parts of the coastline are divided between sandy or pebbly beaches and rocky micro-cliffs. Dune ecosystems have nearly disappeared, except in the south of Sour.

The seashore is subject to local massive erosion, due to strong winter storms. This type of hazard is increased because of sand dredging during the war period and especially because of sediment-load decrease subsequent to the construction of Assouane dam. Recent land reclamations (Northern coast of Beirut, airport new runway in the sea) and sand dredging activities are major causes of coastal hydrodynamic modifications.

Coastal zone is considered to be the richest but at the same time the most endangered area of Lebanon. The majority of industrial, commercial and financial activities of the country as well as the largest cities are concentrated in this area. In a corridor of 500 meters wide along the coastline, 40 % of the surface is absorbed by urbanization and 41 % by agricultural uses, while 19 % remain natural areas (beaches, dunes, etc.). The main industries are located along the coast for easier and a better supply of raw material (including oil through ad hoc terminals) and a faster export of their products to major cities.

However, agricultural and natural zones are not absent in the coastal area. The largest agricultural areas are the southern plain from Saïda to Naqoura, the Akkar plain and the valley of Abou Ali (Koura). As for the most important natural features, these are located between Batroun and Jounieh on one hand, and Sour and Naqoura on the other. Moreover, there are other relatively smaller areas in the hinterlands of Saïda and Damour.

These areas, natural or agricultural, are exposed to permanent pressure of urban sprawl, due to reallocation of rural zones or dense extensions of cities.

Lands located along the seashore are in extremely high demand for their touristic importance and consequently for the output they can generate through classical real estate operations or tourist and seaside resorts. This pressure results in reclamation activities, marina projects for leisure and other maritime public domain violations.

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3 Seafront public domain is defined in Lebanese legislation by the order 144/a dated 10 June, 1925 as being the shore up to a distance where winter tides can reach, as well as sandy and pebble beaches. Ponds and salty water marshes linked to the sea are also a part of the public domain.
Assets and Sensible Sectors of the Coastline

Figure 1.17: The Coastline, a tight space

Figure 1.18: The Coastline, Fragile Assets
1.6 WATER RESOURCES AND MAJOR WATER VULNERABLE AREAS

A Vital Resource

Despite Lebanon’s geographic location in the Middle East, its water resources provide it with a comparative advantage vis-à-vis the surrounding Arab countries. Water management, which represents a major priority for the country, seeks to exploit a maximum of water resources capacity in a sustainable way. Lebanon is determined to improve the quality of domestic water by reducing the pollution of water resources to decrease risks on health.

Although rainfall and river flows had previously been measured until the mid 1970’s, available water balance and water exploitation data is unreliable. The measurements have partially been resumed few years ago; however, data on ground water is limited. Water Authorities may have some records on the amount of ground water used for domestic supply from public wells. However, some 45,000 private wells serving buildings have been reported in 1996 for which no data is available. The same applies to uncontrolled irrigation wells spread throughout the country.

Table 2: Components of Water Balance in Lebanon

<table>
<thead>
<tr>
<th>Components</th>
<th>Average annual volume (Mm$^3$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input: Rainfall + Snow</td>
<td>+ 9 300 $^4$</td>
</tr>
<tr>
<td>Losses from evapo-transpiration</td>
<td>- 4 500 $^5$</td>
</tr>
<tr>
<td>Surface flow in streams (springs excluded)</td>
<td>- 1 800 $^6$</td>
</tr>
<tr>
<td>Groundwater</td>
<td>- 3 000 $^7$</td>
</tr>
<tr>
<td>- Losses outside the national boundaries, into the sea and to neighboring countries: 570 Mm$^3$</td>
<td></td>
</tr>
<tr>
<td>- Un-exploitable groundwater and sea springs: 600 Mm$^3$</td>
<td></td>
</tr>
<tr>
<td>- Natural springs flow: 1 145 Mm$^3$</td>
<td></td>
</tr>
<tr>
<td>- Stored and pumped amounts for domestic and irrigation uses: 685 Mm$^3$</td>
<td></td>
</tr>
</tbody>
</table>

Source: Mudallal (1989)

$^4$ Annual inputs are estimated according to different sources between 8600 and 9700 Mm$^3$, including snowmelt water quantity estimated to around 1000 Mm$^3$.
$^5$ Evaporation and evapo-transpiration losses are estimated to 45-50 % of inputs according to different sources.
$^6$ The part of surface water from direct precipitation and snowmelt (springs excluded) is estimated between 1400 and 2200 Mm$^3$ according to different sources.
$^7$ The part of groundwater is estimated between 2000 and 3000 Mm$^3$. 
Resources Prone to Pollution

Provision of water of adequate quality is quite delicate in Lebanon, considering the geological specificities, which often facilitate pollutants infiltration into water tables and streams. Lebanese aquifer-bearing formations are exceptionally extensive and are generally located underneath extremely permeable and karst formations. These formations have great storage capacities due to intense fractures, fissures and karst networks. Water in these layers often reappears as surface water in the form of springs.

The fractures and karst networks facilitate point and non-point sources pollutants to percolate and infiltrate deep into the ground, thus making groundwater more prone to pollution. Pollutants infiltrated into the ground may reach groundwater within several hours and reappear in the springs and wells used for domestic consumption.

Human activities are likely to generate pollutants that can cause serious consequences on ground water quality. Toxic materials, even if used in small doses, can turn water inconsumable for long periods; while human and animal wastes (domestic wastewater) can cause serious illnesses to users.

Areas of major groundwater-pollution risks had been identified and plotted on maps in the frame of the NPMPLT. Some are within areas already built or cultivated and others are within areas of natural zones. It is crucial to develop a preventive and curative policy for managing pollution of groundwater. Implementing pollution prevention measures will prove less costly on health as well as on public and private finances.
Methodology for Mapping Water Resources Vulnerability

Drawing 1-19:
Geology

Drawing 1-20:
Vulnerability of
Sedimentary Areas

Legend
- Karstic Rocks with Very
  High Permeability
- Karstic Rocks with
  High Permeability
- Other Type of Rocks

Legend
- Shallow Groundwater
- Very Shallow Groundwater

Drawing 1-21:
Intensity of Lineaments

Drawing 1-22:
Main Faults

Legend
- Main Faults
Figure 1.23: Map of Water Resource Vulnerability
1.7 AREAS PRONE TO NATURAL HAZARDS

Natural hazards in Lebanon expose some of the population and their activities, their resources and Lebanon’s heritage to serious risks. Some of these natural hazards have been identified.

It is essential to take into account the risks emerging from these hazards in any urban planning and land management approach, to help minimize catastrophic consequences that a natural disaster may often generate.

Natural hazards are numerous: landslides, floods and torrential rain events, desertification, soil erosion, forest fires, earthquakes, tidal waves, etc.

In a land management approach, it is important to deliberate on two of the above-mentioned hazards, floods and landslides, which occur in cycles or short frequencies (year and decade). Most of the time, it is possible to avoid their catastrophic effects by adopting adequate regulations.

Floods

Torrential floods prone areas have been identified by cross analysis of streams and irrigation channels (flood risk), rock nature and structure in riverbeds (degree of permeability), topography of riverbeds (basin effect), and previously observed events, including those of 2003.

A map for flood prone areas has been produced. It corresponds to areas reported to be at flood risk by several resident generations. These areas are Central Beqaa, plains of Aassi, Wadi Khaled, Akkar and Koura, coastal plains of Sour, Qasmiyeh, Saida and Damour, coastal zone of Chekka, Batroun and Khaldeh, etc.. In North Lebanon people reported that Nahr Abou Ali experienced exceptionally violent torrential floods.

While wisdom of our ancestors had led people to avoid building in flood prone agricultural plains, modern time negligence has pushed people to build parts of cities in such zones. Losses generated from a single flood are far more than virtual losses of the value of land that would have resulted from banning their construction.

In the majority of these regions, floods are the result of soil saturation – usually barely permeable – that leads water level to rise. In some areas, however, they are due to torrential floods of rivers (Qadisha – Abou Ali). In other areas (coastal plains), sea storms create huge tides that “invade” lands and accentuate floods caused by river saturations and rainfall.
Landslides

Landslide hazards prone areas have been identified by crossing data related to unstable rock constitution zones, steep slope (>40 %), previous events marked on the geology maps, faults and more recent landslide events.

A map for landslide prone areas has been produced. High risk zones are those with steep stream basins of Nahr Abou Moussa, Nahr Qadisha, Nahr el-Jaouz, Nahr Ibrahim, Nahr Kalb, etc. High risk zones also include places with steep slopes often located along faults, especially those of Yammounneh (Jbab el-Homr, Yammounneh and west side of West Beqaa) and Wadi et-Taym, but also Ras Shaqaa in the caza of Batroun. The same degree of risk characterizes areas of less steeper slopes, such as the plain of Boqayaa at Wadi Khaled or west side of Koura.

This is surely not an exhaustive inventory. Other areas omitted here for scale reasons (the surface area of these zones were too small to be integrated in the present NPMPLT) should be considered in local urban planning plans.

Other natural hazards

NPMPLT takes into account other risks as well, without however making any specific recommendations of urban planning regulations.

Desertification hazard threatens the arid regions of the Northeast (Hermel and Aassi regions) that are already suffering from economical and social hardships. This threat requires control on urbanization rate, careful management of irrigation and grazing, as well as reforestation efforts. This region should benefit from a development policy, based more on quality (production and service) than quantity improvements. Urban pressure should be oriented, if possible, towards southern agglomerations, Baalbeck and Zahle-Chtaura.

Seismic hazard is omnipresent in every region of Lebanon as a result of its geographical position over two tectonics plates (represented by the two mountain ranges of Lebanon and Anti-Lebanon) that slide facing each other and induce readjustment faults, such as the Roum fault. Hazards are maximal around active faults, but more or less strong tremors could threaten the entire country. Anti-seismic construction regulations are the best solutions to diminish damages and losses. Special attention should be given on Jbab el-Homr, Minyeh, Becharre, Chekka, Ras Chaqaa, Khaldeh, Damour, Wadi Jezzine, Ayshiyeh, Wadi et-Taym and the western part of West Beqaa.
II

CHALLENGES OF THE FUTURE
CHAPTER II

CHALLENGES OF THE FUTURE

Although the National Physical Master Plan of the Lebanese Territories (NPMLT) takes imperatively into account and profits from the physical features of the country, its first concern resides in responding to the numerous challenges that Lebanon faces today and will face in the future.

These challenges include:

- Challenge of economic development
- Challenge of social cohesion
- Demographic challenge
- Challenge of housing
- Challenge of needs: transport, water, wastes, education, health
- Challenge of urban expansion
- Environmental challenge
- Challenge of war and peace in the region

II.1 THE CHALLENGE OF ECONOMIC DEVELOPMENT

The question of economic development has been the main concern of the authorities as well as the entire population since the end of the war. The ambition to see Lebanon’s “natural role” re-established as a pivotal center and a regional pole collided with a series of internal as well as external obstacles, and has succeeded only in a few limited fields (luxury tourism, banking sector, etc.). In parallel, the main exportable services as well as industry and agriculture face a tough competition.

What perspectives await Lebanon for the coming years? How should the country be positioned on the regional and international stage? Should Lebanon count on specific production niches or should it diversify its activities? What are the perspectives of growth that one can imagine for the future?

II.1.1 New rules in international trade

The new century starts with a major challenge for all the countries of the world, particularly developing countries: new regulations due to the growing integration of international trade.
Lebanon, traditionally open to the outside world, has found itself unprepared for these new regulations that consist mainly of the elimination of customs barriers and expose every economic sector of the country to tough world scale competition.

Lebanon has signed, especially with Syria, other Arab countries and the European Union, many agreements that foresee custom barriers abolition. It is to become a member of the World Trade Organization (WTO). And yet the country is subject to important handicaps, in terms of productivity and competitiveness in many sectors (agriculture, industry and exportable services). Huge efforts are to be made as well in terms of transparency and free competition on local markets, and efficiency in the relations between Authorities and economic actors.

II.1.2 Quality assets valorization

In the presence of globalization, economists insist on the issue of “comparative assets” that distinguish a country from its partners and rivals and allow it to gain leading positions in certain markets.

Lebanon possesses a number of physical and human comparative advantages in the Middle East.

Its geographic location between the Mashrek, the Maghreb and Europe, its water resources, fertile lands, natural landscapes and heritage, and quality of life are permanent assets that characterize Lebanon for a series of reasons: climate conditions, hospitality, sea and mountain, etc.

Other important assets are liberal legislation in setting up companies and circulation of capital, relatively high level of education and qualifications, foreign language skills, etc.

The Lebanese Diaspora, excessively vast, plays an important role in international trade networks. The proximity of Lebanon to oil rich countries of the Gulf region gives an excellent opportunity to gain “Petrodollars” in turn for services and goods, and in the form of direct investments.

In addition to these assets, infrastructure have been recently completed in order to host firms, international fairs and exhibitions, luxury tourism, aerial and maritime transport, etc.

It is based on these assets that Lebanon could be distinguished from its direct rivals and build such an economy and social relations that will secure development and prosperity.
II.1.3 Promising niches and diversification

Economical studies\(^1\) showed that the main comparative assets that Lebanon could exploit for international competition in short and medium terms are based on: tourism potential, agricultural potential (food products industry) and country’s know-how in publishing, cultural industry as well as art craft (jewelry). These sectors are, in fact, those in which Lebanon has gained real experience and potential, and at the same time, those in which international and regional markets have not been saturated.

Therefore, it is important for Lebanon to bet strongly on these niches. Products of these fields are much better in the local markets than similar exported ones. They can even be exported themselves, and contribute hence to the external trade balance of Lebanon.

Tourism and food product sectors are both closely linked to the land: their primary asset is landscapes, topography, lands, water, sea, heritage, etc.

Publishing and cultural industries (cinema, television, etc.) are based on an intellectual and industrial knowledge (know-how). Jewelry lies on art craft skills as well as developed commercial and distribution networks.

However, should Lebanon renounce to other possible niches in services, industry and agriculture sectors for which it still lacks enough competitiveness?

Nothing insures that this lack of competitiveness will last on the medium and long terms. It is possible to think that with a sustainable investment, Lebanon could provide someday first class education and medical services in the Near East; develop once again high capacities of information and engineering services for export; and attract medium-technology industries (electromechanical, machinery tools, electronic components, manufactured products for building, etc.).

As for agriculture, with a structural re-organization of the sector (land consolidation, irrigation, preservation, subsidiaries, marketing networks, etc.) Lebanon can acquire an important status for a number of produces, especially high quality rare products, or endemic products.

It is essential never to forget that export oriented products constitute only one part of the economy, though the most strategic and not the most labor demanding one. The economy lies on an entire set of activities oriented towards hard importable or exportable products, such as services for persons, local transport, administration, local trade or construction sectors.

Hence, Lebanon’s economic vision for the future will be based on three principles:

- Activities for which Lebanon possesses undeniable comparative assets: tourism, food products, printing and publishing, and art craft.

\(^1\) Cf. Monitor – Ace for CDR, 2000.
Activities for which Lebanon can become once again competitive, by making significant efforts: high-level services, international transports, medium technology industries, specific agricultural produces, etc.

Activities far from any international competition: services for people and vehicles, local trade, local transport, etc.

The conservation of the diversity of activities is, however, essential for the sustainable re-establishment of the country’s economy, starting with its external trade. To reach that goal, Lebanon has no other choice but to increase its production and improve its competitiveness, by reducing production cost and charges of enterprises and by investing in advanced technology, and vocational and educational training.

II.1.4 Regional economies facing international competition

With progressive abolition of custom boundaries, economic sectors which were far from international competition have found themselves in a difficult situation.

Historically, competitive sectors (enterprise services, industry) were always densely concentrated in Greater Beirut. While peripheral regions were out of competition, given that a number of agricultural products were protected by customs tax on imported similar goods.

With the agreements for progressive custom protection abolition, all the Lebanese regions, including distant ones, will have to face international competition.

For a given city or a region that gradually enters into the sphere of international competition, there can be three kinds of responses to face this competition:

- The first kind of response is to try integrating the region’s economy into the economy of Beirut, the center. By improving means of transport, it can hope for the relocation of certain activities of the capital towards these regions.

- The second kind of response consists of looking at increasing productivity, benefiting from local costs, skills and advantages. This is a matter of modernizing classical activities already rooted in a village or a region.

- The third kind of response consists of identifying and developing products specific to the village or region, which could have an important and dominating share in the exported goods. Such products can be totally new or existing but marginal. Therefore, a city, even a village, can be a main producer of a specific product in the world (art craft, unique culinary product, etc.).

Regions and cities usually react differently, and choose to manage economic sectors by a mixture of the above-mentioned three responses. However, it is the task of the Management Plan to give all regions of Lebanon the opportunities to find the best
way to face the challenge of globalization by two major means: a good link with the center and preservation and valorization of specific potentials of each region.

II.1.5 Macro-economic perspectives

Just like all small countries with open economies, Lebanon is extremely sensitive to changes that can affect import and export product prices, the latter not being related to local supply and demand rule, but imposed from the outside.

The general trend for the coming years announces a decline in these prices, because of globalization perspectives and custom barriers abolition.

This evolution presents a major challenge for the Lebanese economy. The reduction of prices of imported products threatens local production, and at the same time increases their consumption.

Several productive sectors will face a progressive risk because of competition. As a consequence, the major risk would be for the Lebanese production to concentrate in non-competitive activities (not importable or exportable products and services: private services, real estate, etc.). Such an evolution would certainly reduce the per capita income that the Lebanese could have enjoyed from the national production.

In the presence of this challenge, it is crucial to make huge efforts for maintaining the Lebanese standard of living. The present situation, where income exceeds production values by 20% (National Accounting, 1997), can not last forever, because this surplus of income is essentially made up of loans.

A country’s income should correspond in general to its production value. In the specific case of Lebanon, the adjustment of incomes and production can be done based on different methods:

- Either Lebanon’s income decreases because there is not enough production and there is drain of capitals. Imports start decreasing, as well as the prices of local products; the balance is reached at the lowest level. It is the most spontaneous adjustment, but the less beneficial realignment. Resumption of emigration due to recession can be seen. The residents, a less demanding minority, share available income among themselves. This is a low level realignment, the cost of which is considerable losses in human resources.

- Or Lebanon succeeds in increasing its competitiveness in products of international concurrence (imported or exported goods) in a short period of time: This is the most difficult but the most advantageous scenario. The management of this transition phase presents major challenges in this regard.

The most beneficial perspective would be when a drop in prices of imported products is achieved progressively, while local production of the same goods concurrently
gains competitiveness. For this, it is important to work on internal costs (real estate power, administrative services, etc.) that are still considerably high in Lebanon compared to other countries of the region or even worldwide.

**II.1.6 Evolution of GDP**

Lebanon is a country of “medium high” income. According to official estimates, its GDP is around US$ 17.3 billion (in 2002), that is US$ 4,200 per capita. More than 80 states worldwide surpass Lebanon in terms of GDP per capita, and more than 80 others have lower incomes. Lebanon occupies the 8th position among Arab countries for this indicator.

It is difficult to predict Lebanon’s GDP growth for 2030, because the present situation shows major macro-economic disparities, due to high public debts, and because it is difficult to anticipate conditions of rebalancing.

Considering the two extreme hypotheses for adjustment of income and production previously mentioned, the following could be observed:

- In the less advantageous case, a GDP growth that could be nil or even negative in actual terms. The population would stagnate or barely increase (it could even diminish, for the first time, because of a birth rate reduction that had occurred once) and, in the end, the GDP could remain close to its actual level, that is around US$ 17 to 20 billion in 2030. The standard of living of the Lebanese would be nearly the same as today.

- In the more advantageous case, a considerable GDP growth in actual terms is observed, even after a difficult phase of correction of actual public finance crisis. An annual average rate of 5 % is not excluded in view of the available human and capital resources. In the end, GDP level would reach roughly US$ 65 billion in 2030. Population could increase enormously to 6 million people and life standard could be 2.4 times higher.

It is possible to narrow this range of extreme cases by considering closer scenarios for growth:

- On one hand, an annual average growth of 2 %; and  
- On the other, a 2003-2007 evolution, based on the forecast adopted by the Government following Paris II conference in November 2002, followed by a 2008-2030 evolution marked with an annual growth of 3.5 %.

This leads to a GDP value varying between US$ 30 billion (first scenario) and US$ 50 billion (second scenario) in 2030.

The first scenario (2 %) corresponds to a situation where Lebanese production of exchangeable products (imported – exported) would not be significantly developed. With the resumption of emigration that would result, the resident population would
never exceed 4.5 million people in 2030. GDP per capita would reach then around US$ 6,500 per year.

The second scenario (Government plan followed by a 3.5% starting from 2008) corresponds to a situation where local production would be able to adequately resist to the competition induced by imported products. Resident population could reach 5.5 million people in 2030 and GDP per capita would be more than US$ 9,000 per year.

Hence, based on the considered hypotheses, GDP per capita should increase most likely until 2030 from 60% to 100%.

This growth will allow future generations to benefit from a considerably better standard of living. Together with the foreign complementary income, this standard of living will be equal to what people enjoy today in countries such as Cyprus and Argentina. But still, Lebanon will remain far from developed countries, today and definitely in the future.

However, it is important to remember that an important and sustainable growth cannot be reached without a considerable increase in production and productivity. Competitive sectors must be developed more than others to achieve a balance in foreign trade; which could be translated into an evolution of the GDP composition where the relative shares of “other market services”, like industry and agriculture, increase significantly in comparison to the present situation.

### Table 3: GDP composition in 1997

<table>
<thead>
<tr>
<th>Sector</th>
<th>Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture and livestock</td>
<td>6.3%</td>
</tr>
<tr>
<td>Industry</td>
<td>13.5%</td>
</tr>
<tr>
<td>Water, Energy</td>
<td>1.5%</td>
</tr>
<tr>
<td>Buildings and Public works</td>
<td>9.4%</td>
</tr>
<tr>
<td>Transport</td>
<td>5.3%</td>
</tr>
<tr>
<td>Trade</td>
<td>21.3%</td>
</tr>
<tr>
<td>Housing services (Renting)</td>
<td>8.5%</td>
</tr>
<tr>
<td>Other market services</td>
<td>22.6%</td>
</tr>
<tr>
<td>Non-market services (Administrative)</td>
<td>11.6%</td>
</tr>
</tbody>
</table>


### II.1.7 Resources of the State and Municipalities

Will the expected GDP growth allow the State and the Municipalities to gain comfortable margin of flexibility in the future?

This is very uncertain. In the present period, being excessively over-indebted, the Government is trying to reduce its expenses everywhere possible. The day when
Lebanon succeeds in putting an end to its critical indebtedness, there would probably be a more severe control in order to consolidate the established balance and avoid another slip.

Thus, without getting into detailed accounting calculations, which could be meaningless given the extent of numbers and horizons of the Plan, it is obvious that public finance is progressively becoming a limited resource that must be spent rationally and on pre-evaluated objectives in all their dimensions.

These financial horizons can never be ignored. They restrict public service improvement and administrative efficiency.

*Investment* credits offered by the public sector are very limited, because, for a country with limited resources, priority is always for core operating expenditures. Therefore, it would be risky to expect and count on an investment capacity of the State and Municipalities exceeding US$ 40 billion to 50 billion for the coming 30 years, all sources of public income included.

The considered privatization of various public sectors is likely to help rationalize expenses in the given sector (electricity, water, etc.) by investments complementary to those of the public sector. This can be the case of water, power, transport, telecommunications, etc... knowing that a major part of the education and health sectors is already privatized. Nevertheless, Public Authorities should not count on privatization to increase their financial margins. In fact, eventual deficits in operation of the services taken over by the private sector, due to the problem of collection of bills (water, electricity, etc.) or solidarity of the systems (medical, insurance, education grants etc.) should be taken in charge by the State, for a long period of time. Contractors usually secure in their contracts public guarantees against deficits for which they are not responsible.

Hence, if operational margins are to be secured for improving public services, the only possible solutions within the framework of relative scarceness of public finance reside in:

- Redeployment of expenditures (budgetary priorities);
- Minimization of uselessful expenditures (abolition or postponement); and
- Rationalization of the definition of priority projects in each field of action.
II.2 THE CHALLENGE OF SOCIAL COHESION

Lebanon faces a major social challenge due to the addition of many vulnerable factors of the Lebanese society.

The first of these factors is the persistence of the numerous psychological effects of the Lebanese war, some 14 years after the end of hostilities. These effects are portrayed in the restrictions imposed by many Lebanese in their movement and, mostly, when relocating their habitat. This is also revealed by the important weight, that the sectarian belonging occupies in the relationships with others as well as in political attitudes and positions.

The second factor is the poverty that touches a very important portion of the population, which is the result of difficulties in launching the economic activities of the country ever since the end of the war; and of the high cost of living which characterizes Lebanon after-war, and finally of the uneven distributions of incomes.

The figures related to poverty vary as per the statistical sources, yet all of them do converge to demonstrate its amplitude.

The study of the Economic and Social Development Fund – ESDF conducted by the CDR in 2002 has analyzed the situation of households including children in school age, in relevance to 2 poverty lines: the relative poverty line, set at 782 US$ per month and per household (4.8 average family size), and the absolute poverty line, set at 314 US$ per month and per household (also 4.8 average family size). At lower levels than the relative poverty line, it would be impossible to satisfy the household’s essential needs in terms of nutrition, habitat, transport, health care and education expenditures. The absolute poverty line is strictly related to the ability of securing food supply.

The above mentioned ESDF study showed that 42% of the households - including children at school age – live under the relative poverty line (782 US$/month/household) and that 7% of households – and which include children – live under the absolute poverty line (314 US$/month/household).

Another recent source, the study concerning working children and immigration (C. Kasparian, USJ, 2001), has concluded, on the basis of a sample comprising exclusively Lebanese households (with or without children at school age), that 59% of these households had a monthly income lower than to 800 US$ per month, and that 35% of the households had a monthly income lower than to 500 US$ per month. These results are most alarming in the sense that they reveal not only an even higher proportion of poor people than in the previous study, but also because the households of foreigners where poverty is theoretically more acute, particularly in the Palestinian camps, are excluded from the sample.

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2 The GDP per capita had still not recovered, in 2002 its 1974 level (in constant prices).
3 The differences of results between the 2 studies may be due to the fact that the USJ 2001 sample included households without children (individuals or couples) alongside households with children.
**Figure II.1.** Percentage of households living below the absolute poverty level (314 USD per household per month) by Caza, based on the ESFF study of 2002

![Percentage of households living below the absolute poverty level](image)

Source: «Fond du Développement Economique et Social» 2002

**Figure II.2.** Distribution of monthly income of Lebanese households in US $ in 8 categories based on the USJ study of 2001

![Distribution of monthly income of Lebanese households](image)

Figure II.3. : Distribution of Lebanese households in function of their income in 1997 and 2001


Figure II.4 : Population growth in Lebanon between 1931 and 1997
Another fragile factor lies in the possible effects of solving the public finance crisis through taking out a part of the social security system, that allows the support through subsidies and waivers, from thousands of families across Lebanon. What would happen if the State should reduce the number of its public servants, or cut down the retirement pensions, or stop purchasing certain agricultural products above their market values, or collect all the water and electricity dues, before the economy takes off again?

The risk of social fragmentation is even more worrying, as it is rooted across the territory. Akkar and Baalbeck-Hermel are the most extremely poor regions of Lebanon. Tripoli’s situation, north of Nahr Abou Ali, is most alarming. In many rural regions, namely in the South, many villages indicate a high level of poverty despite the fact that they often benefit from local and national systems of social security and subsidiary. Poverty is also present in the suburbs of Beirut; some areas are completely marginalized such as the southern seaside (Jnah, old seaside recreational institutions which have been taken over by squatters). The social situation in the Palestinian refugee camps, mostly in the South and in the North, poses serious concerns.

Confronted with these difficulties, the political class tried taking action by distributing equipments and launching infrastructure works in the regions, under the pretext of “balanced development”. But these answers, even if they temporarily relieve the regions, contribute indirectly to further deepening the social gap between the regions. Additionally, the multiplication of general teaching schools, technical schools and branches of the Lebanese University limits the intermingling of the young generations of the different regions of Lebanon.

The “centrifugal” tendency that affects the Lebanese society has been illustrated in 2002 by claiming for the separation of the Caza of Akkar from the Mohafaza of the North, followed by a similar demand to separate both cazas of Baalbeck and Hermel from the Mohafaza of the Bekaa, and then, by a third one to separate the cazas of Jbayl and Kesrouane from the Mohafaza of Mount Lebanon.

Likewise, Lebanon seems to be the subject of sectarian and social fragmentation forces not only from social and community issues but also from the type of solutions given to economic and social development problems.

It is a major challenge for Lebanon to assert, more than ever, the constitutional principle of territorial unity and the freedom of its citizens to reside and move throughout all the Lebanese regions.

Lebanon should also review the methods of implementation of the “balanced development” concept so that the interventions would not have negative impacts on the goal of the unity of the country. In this perspective, “balanced development” should be further directed towards direct economic activities as well as services infrastructures. It should also favor the establishment of national public facilities to enhance integration between different regions, and increase intermingling between all Lebanese.
This is a long-term action, which relies on the convergence of many policies. The policy of land-use planning should also bring a strong contribution to answering this challenge, through a vision of integration and unification of the future of the territory with a redefinition of the priorities of the “balanced development”.
II.3 THE DEMOGRAPHIC CHALLENGE

Another challenge that Lebanon is facing is the continuous growth of its resident population which will certainly exceed 5 million people before 2030.

Historical background

At the establishment of “Greater Lebanon” in 1920, the country’s population was barely larger than 500,000 people. The first, and the only, comprehensive population Census that dates back to 1931 had given a total number of 793,000 people. At the end of World War II, Lebanon’s population had already exceeded one million inhabitants.

The country then experienced a considerable population growth, at the annual rate of 3.01% for 30 years between 1945 and the outbreak of civil war in 1975. It reached two million people by mid-60’s, and in 1970 there was a total number of 2.3 million people (including the Palestinian camps).

This pace slowed down between 1970 and 1997 and the annual growth rate decreased to an average of 2.08%, which is still considerably high in view of the war conditions for over half of this period. Resident population reached 4 million people in 1997\(^4\).

The evolution observed between 1970 and 1997 took place concurrently with important modifications in the mechanism of the demographic growth, where a significant reduction in fertility rate was noted. This rate is presently 2.3 children per woman (between the ages of 15 and 49), against 4.2 in 1986. There are large differences among the regions (less than 2 in Beirut, around 3 in the North).

Therefore, the natural growth of the population will take a slower rate than previously noted, particularly in Beirut and Mount-Lebanon. National projections show that the annual growth rate would be about 1% between 2000 and 2030, which is less than half the rate identified between 1900 - 1997.

Future growth of less than 1% yearly?

The natural growth of the resident population in Lebanon would reach, all migration trends excluded, 5.6 million people in 2030 (middle scenario). But Lebanon will not reach this figure because of important emigration rates.

Departures (immigrations) are closely linked with the economic and political situation of Lebanon as well as of the destination countries. They have been considerable during the years of war, slowed down since 1992, but remained however relatively high until 1997, and started once again to increase after 1998. These movements

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\(^4\) Amongst the 4 million inhabitants officially residing in Lebanon (CAS) in 1997, Palestinian refugees censed by the UNRWA in the Camps accounted for at least 350,000 people. This number has reached 391,000 in June 2003, according to UNRWA. Half of these refugees live in the camps of the South and one third in the camps of Mount-Lebanon (Beirut suburbs).
include Lebanese emigrants as much as foreigners that return to their homeland, or Palestinians that leave Lebanon.

Newcomers are affected by the same economic and political factors. Such factors concern Lebanese citizens returning to Lebanon as well as foreigners immigrating to Lebanon for professional purposes.

Based on objective analysis of scarce available data on migrations in Lebanon\(^5\), two scenarios related to magnitude of departures were studied:

- The first one corresponds to a more balanced economic development and is characterized by fewer departures and arrivals than in the past, and where migration balance would be around \(-6,000\) persons per year between 2001 and 2030 (that is around 170,500 persons for the whole period).

- The second one corresponds to a less balanced economic development, where departures and arrivals would be more in magnitude and migration balance would be around \(-27,000\) persons yearly between 2001 and 2030 (roughly 789,180 persons for the whole period).

The effect of this negative balance of migrations with the outside would be to reduce the population size that would be induced from a natural growth until 2030. Instead of having a population of 5.6 million people in 2030, there would be 5.4 million people as per the first scenario and 4.8 million people as per the second one.

**The Physical Master Plan adopts a medial scenario, between these two scenarios, with 5.2 million inhabitants in year 2030.**

This scenario does not take into account Palestinian refugee displacements that could result from international agreements in the frame of any peace process in the Middle East. It is important to remember that this issue concerns around 0.4 million people currently living in camps (according to 2003 UNRWA census), half of them in the South (basically Saida and Tyre) and one third in the camps of Mount-Lebanon (Beirut suburbs) and 14% in the North (northern suburb of Tripoli).

**Geographic distribution of population**

The 2030 population\(^6\) has been projected at Mohafaza level, taking into account the fertility rate of each Mohafaza and its probable evolution. The results have been grouped in 4 geographic areas: Beirut and Mount-Lebanon, North and Akkar, Beqaa and Baalbeck-Hermel, South and Nabatiyeh.

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\(^6\) Palestinians included.
Table 4: Projected population growth by groups of Mohafaza for 2030

<table>
<thead>
<tr>
<th>Population in 1997</th>
<th>Population in 2030</th>
<th>Growth %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beirut and Mount Lebanon</td>
<td>1,910,896</td>
<td>2,310,000</td>
</tr>
<tr>
<td>North and Akkar</td>
<td>807,204</td>
<td>1,140,000</td>
</tr>
<tr>
<td>South and Nabatiyeh</td>
<td>747,477</td>
<td>1,040,000</td>
</tr>
<tr>
<td>Beqaa and Baalbeck-Hermel</td>
<td>539,448</td>
<td>740,000</td>
</tr>
<tr>
<td>LEBANON</td>
<td>4,005,025</td>
<td>5,230,000</td>
</tr>
</tbody>
</table>

Source: NPMPLT study, 2004

Table 5: Projected distribution of population by groups of Mohafaza for 2030

<table>
<thead>
<tr>
<th>Population in 2030</th>
<th>% in 2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beirut and Mount Lebanon</td>
<td>2,310,000</td>
</tr>
<tr>
<td>North and Akkar</td>
<td>1,140,000</td>
</tr>
<tr>
<td>South and Nabatiyeh</td>
<td>1,040,000</td>
</tr>
<tr>
<td>Beqaa and Baalbeck-Hermel</td>
<td>740,000</td>
</tr>
<tr>
<td>LEBANON</td>
<td>5,230,000</td>
</tr>
</tbody>
</table>

Source: NPMPLT study, 2004

Differences in fertility rates can change the relative shares of each Mohafaza. In general, each of the three Mohafazas (North, South and Beqaa) gained a point while Beirut and Mount-Lebanon lost 3 points.

Within each Mohafaza, scenarios are considered in relation to the % of population living in large agglomerations (more than 400,000) on one hand, and the % living outside these agglomerations on the other hand. At the national scale, the population in large agglomerations would increase from 64 % in 2000 to 65 % in 2030.
### Table 6: Proportion of inhabitants in agglomerations in 2000 and 2030

<table>
<thead>
<tr>
<th>Geographic entities</th>
<th>2000 Total population</th>
<th>Population in large agglomerations</th>
<th>2030 Total population</th>
<th>Population in agglomerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beirut and Mount Lebanon</td>
<td>1,911,000</td>
<td>1,651,000</td>
<td>2,310,000</td>
<td>1,990,000</td>
</tr>
<tr>
<td>North and Akkar</td>
<td>807,000</td>
<td>385,000</td>
<td>1,140,000</td>
<td>620,000</td>
</tr>
<tr>
<td>South and Nabatiyeh</td>
<td>747,000</td>
<td>327,000</td>
<td>1,040,000</td>
<td>490,000</td>
</tr>
<tr>
<td>Beqaa and Baalbeck-Hermel</td>
<td>539,000</td>
<td>181,000</td>
<td>740,000</td>
<td>300,000</td>
</tr>
<tr>
<td><strong>LEBANON</strong></td>
<td><strong>4,005,000</strong></td>
<td><strong>2,544,000</strong></td>
<td><strong>5,230,000</strong></td>
<td><strong>3,400,000</strong></td>
</tr>
</tbody>
</table>

Source: NPMPLT study, 2004
II.4 THE CHALLENGE OF HOUSING SECTOR

The growth of house construction is mostly related to increase in the number of households, which increases faster than population size, due to the decrease in the cohabitation phenomenon: with a constant population, the number of households increases because the average size of a household tends to diminish.

The average household size in Lebanon was 5.3 persons in 1970. It dropped down to 4.8 persons in 1997. In comparison, this average is still 6.8 persons in Pakistan and 5 in the Philippines, but only 4.7 in Tunisia, 2.4 in France and 2.3 in Quebec. This reduction is due to a higher standard of living change in habits and traditions as well as ageing of the population.

The National Physical Master Plan adopted a reasonable scenario of a reduction of the average household size at the rate recorded in the past 30 years. Hence, it would drop from 4.76 persons per household in 1997 down to 4.34 in 2020 and 4.21 in 2030.

\[\text{Table 7: Evolution of household size through 2030}\]

<table>
<thead>
<tr>
<th></th>
<th>1997</th>
<th>2030</th>
<th>Evolution 1997 – 2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>4,005,000</td>
<td>5,238,200</td>
<td>+ 31 %</td>
</tr>
<tr>
<td>Household size</td>
<td>4.8</td>
<td>4.2</td>
<td>- 13 %</td>
</tr>
<tr>
<td>Number of households</td>
<td>843,600</td>
<td>1,321,600</td>
<td>+ 57%</td>
</tr>
</tbody>
</table>

The number of households in 2030 will be slightly higher than the number of primary residences. Taking into account the cohabitation aspect, i.e., more than 1 family living in a house, the ratio considered is 1.024 households per primary residence. By using this ratio, there will be 1,291,000 primary residences in the year 2030. A considerable number of secondary residences and vacant houses are to be added.

Secondary residences used to represent 5.92 % of total no. of houses in 1996 (lower than the 1970 value of 10.6%), while vacant houses represented 17.20 % (significantly higher than the 1970 of 7.6 %).

For the future, the National Physical Master Plan considers that the increase of secondary residences, an important factor for the economy of villages, would reach about 11%, which is the one observed in 1970. It considers as well a relative decrease in the proportion of vacant houses (which was abnormally high during the 1990’s due to the population displacements prior to 1990 and real estate boom after that) to reach that of the 1970’s, which was 8 %.
The above adopted hypotheses lead to fixing the part of secondary residences and vacant houses to 19% of the housing stock in 2030 (against 18.2% in 1970 and 23.1% in 1997).

Table 8: Evolution of housing stock in Lebanon through 2030

<table>
<thead>
<tr>
<th></th>
<th>1996</th>
<th>2030</th>
<th>Evolution 1997 - 2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary residences</td>
<td>792,000</td>
<td>1,291,000</td>
<td>+ 63 %</td>
</tr>
<tr>
<td>Secondary residences</td>
<td>63,000</td>
<td>142,000</td>
<td>+ 125 %</td>
</tr>
<tr>
<td>Vacant dwellings</td>
<td>183,000</td>
<td>127,000</td>
<td>- 30 %</td>
</tr>
<tr>
<td>Other</td>
<td>25,000</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total housing stock</strong></td>
<td><strong>1,063,000</strong></td>
<td><strong>1,560,000</strong></td>
<td><strong>+ 47 %</strong></td>
</tr>
</tbody>
</table>

The growth in number of dwelling units of around 500,000 in 30 years remains lower than the number of units that will be built because construction includes, besides the reaction to demand, replacement of dilapidated and old houses. Every year, around 2000 units would be destroyed and replaced by new ones, which will raise total construction up to 560,000 units between 1997 – 2030 (roughly 16,000 to 17,000 units yearly).

A social challenge

However, the issue of dwellings could not be studied only from a quantitative point of view. Access to a dwelling in a country of medium and unevenly distributed income is critical, especially for young households.

Recent studies have shown a discrepancy between income level of the majority of youngsters below 30 years of age and costs for a dwelling. This situation induces certainly over-indebtedness, adopting illegal solutions or permanent cohabitation with parents, marriage postponement or even emigration.

There has to be solutions in order to support moderate apartment rentals, particularly in large agglomerations.
II.5 THE CHALLENGE OF NEEDS: TRANSPORT, WATER, WASTE, EDUCATION AND HEALTH

The demographic growth of 1.2 million people over 30 years would necessarily be translated into growing needs for the various urban services.

The evolution of the Lebanese society with time will be translated as well into modifications in behaviors and expectations, particularly mobility, number of daily trips, education of children and health care demands.

These evolutions had been estimated as follows:

<table>
<thead>
<tr>
<th></th>
<th>2000</th>
<th>2030</th>
<th>Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population (middle scenario)</td>
<td>4,000,000</td>
<td>5,230,000</td>
<td>+ 31 %</td>
</tr>
<tr>
<td>Transport</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% of households having at least one car</td>
<td>65 %</td>
<td>75 %</td>
<td>+ 10 points</td>
</tr>
<tr>
<td>Total number of private cars</td>
<td>700,000</td>
<td>1,100,000</td>
<td>+ 57 %</td>
</tr>
<tr>
<td>Number of daily motorized trips / person</td>
<td>0.7</td>
<td>1.1</td>
<td>+ 57 %</td>
</tr>
<tr>
<td>Number of daily motorized trips/TOTAL</td>
<td>2,800,000</td>
<td>5,700,000</td>
<td>+ 100 %</td>
</tr>
<tr>
<td>Water</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Daily domestic water demand / person</td>
<td>200 liters</td>
<td>220 liters</td>
<td>+ 10 %</td>
</tr>
<tr>
<td>Total domestic water demand / year</td>
<td>296 Mm³</td>
<td>418 Mm³</td>
<td>+ 41 %</td>
</tr>
<tr>
<td>Wastes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight of domestic wastes per person</td>
<td>336 kg</td>
<td>420 kg</td>
<td>+ 25 %</td>
</tr>
<tr>
<td>Weight of total domestic wastes in Lebanon</td>
<td>1.3 MT</td>
<td>2.2 MT</td>
<td>+ 63 %</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group of ages between 3 to 22 (school age)</td>
<td>1,510,000</td>
<td>1,590,000</td>
<td>+ 5.3 %</td>
</tr>
<tr>
<td>% of youngsters of school age</td>
<td>72 %</td>
<td>75 %</td>
<td>+ 3 points</td>
</tr>
<tr>
<td>Number of youngsters of school age</td>
<td>1,100,000</td>
<td>1,193,000</td>
<td>+ 7.5 %</td>
</tr>
</tbody>
</table>

Challenges of the transportation sector

In 30 years, the vehicle fleet will increase by almost 60 %, as will the average number of daily motorized trips per person in the same proportions. This will double the total number of motorized trips, taken into account the expected demographic growth. This evolution will provoke problems of infrastructure, densely located in the Central Urban Area (Greater Beirut and Mount-Lebanon), where the situation could become critical in many places if adequate managements or serious alternative public transport are not implemented. Similar problems will arise at the entrances and crossings of large cities. Road networks in rural regions, however, would continue responding to the needs, without having to increase their capacity.
Challenges of water demand

The increase in water demand for domestic consumption is related to demographic growth (30% in 30 years) as well as to the growth in daily personal usage of water (that could be estimated to be 10% in 30 years). The combination of these two factors would lead to a domestic demand of roughly 420 Mm$^3$ (net volume, losses in the network excluded) in 2030, 41% more than in 2000. This perspective constitutes a major challenge to the country, because the total volume actually distributed by the Water Authorities is roughly 280 Mm$^3$, only half of which reach consumers (because of losses) who developed their own means of water provision (wells and tankers). Hence, even if current losses in networks of 50% will be reduced to 20% in 2030, Water Authorities will have to distribute 520 Mm$^3$ (11% of the annual water balance in Lebanon after evaporation) in order to satisfy the total domestic need. This presumes a simultaneous increase of 86% of distributed quantities by the Authorities and reduction of leakages from 50% to 20%. Without this double effort, private and uncontrolled groundwater extraction would reach dangerous levels and high risk of water shortage in many regions of the country, especially the large agglomerations.

Complementary resources should also be secured for irrigation. Currently, around 100,000 hectares (42% of cultivated areas, 33% of cultivable lands) are irrigated or receive complementary irrigation. Of these 30,000 hectares constitute small parcels of less than 1 dunum. Ongoing projects concern nearly 40,000 hectares of additional irrigated lands; which is equivalent to a growth of 40% of irrigated areas. The amount of water presently used for irrigation is 700 Mm$^3$ yearly. Expected growth would increase this amount to more than 1 Mm$^3$ yearly (around 25% of the annual water balance after evaporation). This constitutes a major challenge, though it would cover at this stage, only half of exploitable lands in Lebanon.

Challenges of the solid waste sector problem

The quantities of solid wastes to collect and treat constitute another major challenge. In 2001, each person used to generate 336 kg of waste per year. This quantity will certainly increase. It has already increased by 30% between 1994 and 2001 with an annual average rate of 4%. However, this growth is not indefinite, as demonstrated in the industrialized countries, where quantities of wastes generated per person have reached stable levels. In France, the weight is 420 kg of wastes per year per person. If this rate is considered for Lebanon, the generated quantity in 2030 will be 2.2 MT of domestic wastes per year, which will represent around 85-90% of total generated weight of waste. This constitutes a 63% increase, compared to the current situation. Will Lebanon, that did not yet adequately solve its solid waste management problem, manage to answer this future challenge?

Needs for education facilities

As far as education is concerned, the major element to consider will be the decrease in the number of school-age youngsters of the total population. The 3 to 17 years old group represents today 30% of the total population. In 2030, they will represent only 23%. Their absolute number will remain steady of around 1.2 million people. The
category of 17 to 22 years old will stabilize around 7.5% of population and their number will increase from 310,000 people in 2000 to 390,000 in 2030. This will be represented by an increase of 25% staggered along 30 years. The number of children and youngsters from 3 to 22 years old, which constitutes the majority of school and university age group, will increase from 1,510,000 to 1,590,000 between the years 2000 and 2030. Lebanon’s scholar system “fosters” at present around 1,100,000 students, which is more than 72% of the concerned population group. This rate is already high, compared to other countries with similar or higher than Lebanon’s social and economic situation. Even if this rate increases to 75% in 2030, additional accommodation capacities will be limited to roughly 90,000 places over 30 years, which is around 3000 places yearly, completely in the post-baccalaureate level.

Developments of the health care sector

In the health care sector, it is expected that the increase in demand would exceed the increase of the population, due to various factors, such as ageing, health and preventive care improvement, purchasing power, etc. On the other hand, health care supply should no more be envisaged in a classical approach, which is outdated in Europe and the USA, i.e, the number of beds for a given population. The future system is to provide health care without necessarily having to displace the patients. A large number would not have to leave their residences anymore and will be granted permanent assistance and care. Furthermore, the future will see technical plateaus being regrouped, for financial, security, as well as efficiency reasons. This assembling will have to be accompanied by remarkable improvements in the means of transport and transfer of patients.

At present, Lebanon is not facing problems of hospital bed capacity nor technical plateau supply. It is endowed with roughly 170 hospitals, having a total number of 10,000 beds, equivalent to one bed for 400 inhabitants, which is considered to be a very high rate. Besides, there are around 6 newly built public hospitals, designed to supply, altogether, 1,000 additional beds.

The challenge to face here lies more in the quality of health care, access of deprived people, control on expensive prescriptions (supported by public finance) and most generally, health care cost management. It is particularly essential to define as soon as possible, expected shares of private offers on one hand, and public offers on the other, and to clarify rules related to percentage of expenses covered by consumers themselves, by the health insurance system, private insurance as well as public finance.
II.6 THE CHALLENGE OF URBAN SPRAWL

II.6.1 Expected urban growth

The growth of housing stock, the development of facilities, and the appearance of new activities would induce a growth of urbanized areas, with the addition of 250-300 km$^2$ over a 30 year period to the existing 600 km$^2$ of urbanized areas (in 2000).

In fact, at the beginning of the 1960’s, Lebanon had a population of only 2 million people and 260 km$^2$ of urbanized areas; that is 130 m$^2$ per inhabitant. In 1998, these numbers increased to 4 million people, 600 km$^2$ of urbanized areas and 150 m$^2$ per inhabitant. In 2030, adopting a ratio of 170 m$^2$ of urban area per inhabitant, there will be a total urbanized area of 884 km$^2$, for a population of 5.2 million people, which represents a growth of 284 km$^2$ within 30 years.

These statistics show that future urban growth should be between 250 and 300 km$^2$, that is an annual growth rate similar, in absolute value, to that of the 1963-1998 period (the only available information to date: + 10 km$^2$ per year).

This expansion poses a major challenge for Lebanon, because its potential impact, depending on how it is managed, could be important on the quality of life, water resources availability, costs of infrastructures, and the future of natural, agricultural and landscape areas.

Urban sprawl will be located according to the following two factors:

- Evolution of demand for housing, enterprise and facilities: it is characterized by an important inertia, in the sense that the existing urban structure remains determined – at national, regional and local scales – by the urban pressure. Therefore, growth of large development areas in the different regions and agglomerations will be only marginal (see previous tables of the “Demographic Challenge”).

- Action of the Authorities: legislation, localized decisions, and provision of infrastructures and facilities have an important effect on the form of urbanization, in terms of concentration or scattering, more or less high densities, more or less harmonious aspects, avoiding or not a number of sensitive areas (natural, agricultural, flood prone area, etc.).

It is the second factor that weighs the most in the potential impact that urban expansion might generate on resources, costs, quality of services and quality of life.
II.6.2 Distribution of lands for urbanization

Distribution of lands intended for urbanization has been analyzed for the coming 30 years, taking into account a progressive densification of areas nearest to cities (in terms of construction as well as demographic development) and an un-densification of current highly dense urban zones (in terms of demography).

Distribution of some additional 250 to 300 km$^2$ of urbanized surfaces has been carried out in steps:

- Geographical distribution of resident population in 2030 (or housing stock, which is almost the same) has been carried out on the basis of Mohafazas, and then distributed within each Mohafaza (see “Demographic Challenge”).

- The tendency of the existing urban structure to increase or decrease its density (by number of dwellings per urbanized residential hectare) has been evaluated. It was possible to identify for each agglomeration a maximum accommodation population capacity in existing urban structure by 2030, and the needs for expansion (expressed in number of dwellings).

- Available areas (except highly steep slopes) have been surveyed in the perimeter and around each important agglomeration. The capacity of accommodating population has been evaluated using densities, in logical continuity of existing conditions.

- Urban expansions have therefore been roughly planned around existing agglomerations, by avoiding agricultural terrains, major natural areas, steep slopes, and hazardous zones.

- This first exercise has been adjusted, afterwards, taking into consideration the spatial choices of the National Physical Master Plan, particularly the will to alleviate the urban pressure exerted on coastal areas, in favor of a more controlled development of interior large agglomerations such as Zahle-Chtaura and Nabatiyeh.

The result of total urban sprawl distribution (300 km$^2$ or 30 000 hectares) is presented as follows:

- Central Urban Area (Greater Beirut and surrounding agglomerations) would have roughly an additional area of 5 500 hectares.
- The agglomeration of Tripoli would need an additional area of around 1,800 hectares, if it is intended to decrease the particularly high densities of the center and the suburbs\(^7\).

- Other large agglomerations in the country (Baalbeck, Zahle-Chtaura, Nabatiyeh, Saida, Tyre, Jbayl) would need an additional area between 6,000 to 1,000 hectares each, in order to satisfy their urban expansion\(^8\).

- The rest of the cities and villages of Lebanon (more than 1,000) would need all together around 12,000 to 15,000 hectares that is an average of 1.2 to 1.5 hectares per locality (average varying according to size and geographic location of the locality).

**Precisions of methodology**

The numbers of urbanized areas in 2030 that result from this forecast should be explicitly interpreted.

Hence, while foreseeing a growth in the urbanized areas of the Central Urban Area from 170 km\(^2\) up to 225 km\(^2\) (a growth of 55 km\(^2\) in some 30 years), it should not be concluded that the urban planning should provide an area of 55 km\(^2\) to accommodate residents and additional activities from now and until 2030.

In fact, it is in general necessary to prepare the local urban planning documents for larger constructible areas than expected. The reason behind this difference is due to the fact that property market cannot be controlled by a plan. Even if the land is classified for high rise buildings, it could remain unused, or built with less than \% maximum capacity.

This methodological comment should be taken into account while elaborating local urban planning documents, or reviewing old ones, in which the most important issue is to locate areas of urban expansion and offer rights to build, exceeding forecasted volume of expected demand (which itself, is not an approximation).

---

\(^7\) Expansion of the agglomeration of Tripoli would be obviously less important should a settlement of the Palestinian cause occur, including return of refugees and closing of the camps.

\(^8\) For Saida and Tyre, urban sprawl would be significantly less important should a settlement of the Palestinian cause occur, including return of refugees and closing of Ain-Heloueh, Bas, Rashidiyeh and other camps.
### Table 10: Urban and demographic growth in Central Urban Area

<table>
<thead>
<tr>
<th></th>
<th>Urbanized surfaces in 2000 (km²)</th>
<th>Resident population 2000</th>
<th>Urbanized surfaces in 2030 (km²)</th>
<th>Resident population 2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beirut</td>
<td>20</td>
<td>400,000</td>
<td>20</td>
<td>400,000</td>
</tr>
<tr>
<td>First ring</td>
<td>70</td>
<td>900,000</td>
<td>80</td>
<td>1,000,000</td>
</tr>
<tr>
<td>Second ring</td>
<td>80</td>
<td>300,000</td>
<td>125</td>
<td>530,000</td>
</tr>
<tr>
<td>TOTAL</td>
<td>170</td>
<td>1,600,000</td>
<td>225</td>
<td>1,930,000</td>
</tr>
</tbody>
</table>

Note: The 2000 population of the first ring includes Palestinian refugees. The projections of growth would be less in this zone, in case the Palestinian cause is settled and the camps are to be closed.

### Table 11: Urban and demographic growth in the agglomeration of Tripoli

<table>
<thead>
<tr>
<th></th>
<th>Urbanized surfaces in 2000 (km²)</th>
<th>Resident population 2000</th>
<th>Urbanized surfaces in 2030 (km²)</th>
<th>Resident population 2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tripoli</td>
<td>8.0</td>
<td>220,000</td>
<td>14.0</td>
<td>320,000</td>
</tr>
<tr>
<td>Suburbs</td>
<td>15.0</td>
<td>102,000</td>
<td>27.0</td>
<td>210,000</td>
</tr>
<tr>
<td>TOTAL</td>
<td>23.0</td>
<td>322,000</td>
<td>41.0</td>
<td>530,000</td>
</tr>
</tbody>
</table>

Note: The 2000 population in suburbs includes Palestinian refugees. The projections of growth would be less in this zone, in case of the Palestinian cause is settled leading to closing of camps.

### Table 12: Urban and demographic growth in the agglomeration of Saïda

<table>
<thead>
<tr>
<th></th>
<th>Urbanized surfaces in 2000 (km²)</th>
<th>Resident population 2000</th>
<th>Urbanized surfaces in 2030 (km²)</th>
<th>Resident population 2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saida</td>
<td>3.3</td>
<td>88,000</td>
<td>4.0</td>
<td>80,000</td>
</tr>
<tr>
<td>Suburbs</td>
<td>12.1</td>
<td>86,000</td>
<td>21.0</td>
<td>186,000</td>
</tr>
<tr>
<td>TOTAL</td>
<td>15.4</td>
<td>166,000</td>
<td>25.0</td>
<td>266,000</td>
</tr>
</tbody>
</table>

Note: as Table 11.
### Table 13: Urban and demographic growth in the agglomeration of Jbayl

<table>
<thead>
<tr>
<th></th>
<th>Urbanized surfaces in 2000 (km²)</th>
<th>Resident population 2000</th>
<th>Urbanized surfaces in 2030 (km²)</th>
<th>Resident population 2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jbayl</td>
<td>2.0</td>
<td>14,000</td>
<td>2.5</td>
<td>16,000</td>
</tr>
<tr>
<td>Suburbs</td>
<td>11.6</td>
<td>37,000</td>
<td>14.0</td>
<td>49,000</td>
</tr>
<tr>
<td>TOTAL</td>
<td>13.6</td>
<td>51,000</td>
<td>16.5</td>
<td>65,000</td>
</tr>
</tbody>
</table>

### Table 14: Urban and demographic growth in the agglomeration of Zahle

<table>
<thead>
<tr>
<th></th>
<th>Urbanized surfaces in 2000 (km²)</th>
<th>Resident population 2000</th>
<th>Urbanized surfaces in 2030 (km²)</th>
<th>Resident population 2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zahle</td>
<td>4.1</td>
<td>52,000</td>
<td>4.5</td>
<td>55,000</td>
</tr>
<tr>
<td>Suburbs</td>
<td>7.8</td>
<td>65,000</td>
<td>15.5</td>
<td>138,000</td>
</tr>
<tr>
<td>TOTAL</td>
<td>11.9</td>
<td>117,000</td>
<td>20.0</td>
<td>193,000</td>
</tr>
</tbody>
</table>

### Table 15: Urban and demographic growth in the agglomeration of Nabatiyeh

<table>
<thead>
<tr>
<th></th>
<th>Urbanized surfaces in 2000 (km²)</th>
<th>Resident population 2000</th>
<th>Urbanized surfaces in 2030 (km²)</th>
<th>Resident population 2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nabatiyeh</td>
<td>3.5</td>
<td>22,000</td>
<td>5.5</td>
<td>40,000</td>
</tr>
<tr>
<td>Suburbs</td>
<td>11.5</td>
<td>30,000</td>
<td>15.5</td>
<td>44,000</td>
</tr>
<tr>
<td>TOTAL</td>
<td>15.0</td>
<td>52,000</td>
<td>21.0</td>
<td>84,000</td>
</tr>
</tbody>
</table>

Note: idem Table 11.
Table 16: Urban and demographic growth in the agglomeration of Baalbeck

<table>
<thead>
<tr>
<th></th>
<th>Urbanized surfaces in 2000 (km²)</th>
<th>Resident population 2000</th>
<th>Urbanized surfaces in 2030 (km²)</th>
<th>Resident population 2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baalbeck</td>
<td>5.5</td>
<td>50,000</td>
<td>7.0</td>
<td>70,000</td>
</tr>
<tr>
<td>Suburbs</td>
<td>3.9</td>
<td>30,000</td>
<td>8.4</td>
<td>35,000</td>
</tr>
<tr>
<td>TOTAL</td>
<td>9.4</td>
<td>64,000</td>
<td>15.4</td>
<td>105,000</td>
</tr>
</tbody>
</table>

Table 17: Urban and demographic growth in the agglomeration of Tyre

<table>
<thead>
<tr>
<th></th>
<th>Urbanized surfaces in 2000 (km²)</th>
<th>Resident population 2000</th>
<th>Urbanized surfaces in 2030 (km²)</th>
<th>Resident population 2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tyre</td>
<td>3.1</td>
<td>48,000</td>
<td>3.4</td>
<td>52,000</td>
</tr>
<tr>
<td>Suburbs</td>
<td>6.7</td>
<td>69,000</td>
<td>12.9</td>
<td>122,000</td>
</tr>
<tr>
<td>TOTAL</td>
<td>9.8</td>
<td>117,000</td>
<td>16.3</td>
<td>174,000</td>
</tr>
</tbody>
</table>

Note: as Table 11.
Figure II.5   Urban pressure
II.7 ENVIRONMENTAL CHALLENGE

For the coming decades, Lebanon will be facing more environmental degradation challenges.

Demographic growth, urban expansion and life standard improvement (which would lead to higher possibilities for construction, vehicle facilities, etc.) will in fact increase the pressure on natural resources.

II.7.1 Water quality

Groundwater quality is already in an alarming situation, due to the infiltration of pollutants (wastewater, industrial wastes, solid wastes leachates, etc.) and the increase of uncontrolled drilling of wells (more than 45 000 private wells, according to the 1996CAS Census). This pollution has direct effects on public health and health-related expenditures.

Demographic and urban growth foreseen for the coming 30 years can lead the water resources sector to a catastrophic situation if the number of wells, instead of decreasing, continues on increasing, or if water treatment projects lag behind, especially in zones of vulnerable resources (prone to high infiltration into the ground).

Thus, ending the degradation of water resources constitutes one of the most important challenges that Lebanon will have to face in the coming decades.

II.7.2 Wastes

Solid waste generation is expected to grow by more than 60% by 2030. This represents a significant challenge for the national and municipal authorities.

To date, only collection of domestic waste had been managed reasonably well. Dumping sites were badly managed and those of large cities ended up looking as mountains of non compact wastes at the seashore in most cases (Saida, Bourj Hammoud,…). These sites reached their saturation capacity in few years and occasionally caused accidental pollution problems. Solid wastes in rural areas are still disposed off in dumps, mostly on the banks of valleys causing high risk to water pollution, and thus health and tourism activities.

Sanitary landfill sites should be managed in a totally different way, based on solutions that commensurate with the size of the challenge. In the short-term, it is necessary to locate sites capable of absorbing 1.5 million tons per year, equivalent to nearly 1 million cubic meters of compacted wastes, more than half of which are generated by Mount Lebanon and Beirut. If sanitary landfill sites are designed for 20-m height, half of which are below ground, an annual area of more than 10 to 15 hectares would be required at the national scale. If waste were not properly compacted, the land required would be more than 40 hectares per year.
In the Central Urban Area, the challenge consists of where to find 6 to more than 20 hectares of land per year that would be far from residential areas?

In other regions, landfills will require less area, but those serving large agglomerations will necessarily be of larger size.

Surely, it is possible to envisage a reduction in the quantities of waste by previous composting or waste-to-energy treatment. These solutions, however, are very slow to implement, because they require significant funding. Even in the case of an ideal treatment of all wastes, the “ultimate waste” volume would not be reduced by more than 30% to 40%.

**II.7.3 Quarries**

Quarries and the pressure they exert on natural areas as well as on the quality of life constitute another major challenge to the environment.

Lebanon did not succeed in adequately managing this issue. Many quarries (the majority of them) are unlicensed, and most of them, even the authorized ones, have not respected legal dispositions in terms of material extraction and site rehabilitation.

Hence, the attitude of the authorities has been divided between the recognition of economic and social importance of quarries, the need to put an end to illegal activities or on the contrary tolerating them, or total and firm prohibition on the entire territory. The authorities did not take a definitive decision whether extraction sites should be concentrated in few zones, or on the contrary, distributed on small and medium-sized quarries all over the country.

Hundreds of relatively old quarries in Lebanon have caused a serious visual intrusion to the often spectacular natural landscapes of more than 3,000 hectares of lands. Every year, the needs of the country for raw material would require the use of tens of additional hectares.

**Demands for raw material—roughly 3 million m\(^3\) per year**

The challenge of quarries is to be examined, differentiating between 4 major categories of materials: gravel, sand, calcareous cement and stone. The significant pressure on the landscape and the environment concerns essentially sand and gravel, which represent more than 80% of the demands.

An average of 200 to 300 tons of aggregates (sand and gravel) is required to build an apartment. Over the period 2000 to 2030, an annual average between 2 metric tons (lower scenario) and 4 metric tons (higher scenario) of aggregates is required for apartment construction only.

The needs related to other types of construction (offices, industrial, and commercial facilities) are estimated at 0.5 Mt per year over the same period.
Finally, the aggregates needed for road construction are estimated at an average of
5,000 tons of aggregates per 1 km of road (double carriage way) construction and
20,000 tons per km of new highway. Ordinary road maintenance consumes around
10% of these values, while rehabilitation can even consume 40%. Hence, if Lebanon’s
entire road network is to be maintained or rehabilitated only once during the 25
coming years, and should the network be extended in reasonable proportions, an
annual volume of roughly 2 Mt of aggregates is required.

Overall, Lebanon’s current demands for aggregates can be estimated as follows: 2 to
4 Mt per year for houses, 0.5 Mt per year for other types of construction and 2 Mt per
year for roads. This makes a total quantity in the range of 4.5 and 6.5 Mt per year, or 2
to 2.5 Mt.

With other extracted materials (calcareous cement, rocks, clay, etc.), the volume to
extract – for the Lebanese BTU current needs – could represent up to 3 million m$^3$
per year (including aggregates).

If the entire volume is to be provided from local production, the impact of quarries in
terms of site disturbances would be significant. In fact, we shall account for the
percentage of waste contained in the extracted material and for the land used for
storage, circulation, set back, etc. As such, for obtaining 3 Mt of usable material,
some 4 Mt should be extracted and the areas required would be 60 to 80 hectare per
year.

Taking into consideration the rough topography of Lebanon and the high rate of
urbanization, a rigorous management policy is required to control the quarrying
activities.

Land reclamation, the great consumer of materials

The problem of quarries has emerged in Lebanon with large-scale reconstruction
projects during the 1990’s. With limited authority control, demand for materials has
been significant, ranging between 10 Mt and 15 Mt per year during the period
1994-2000. A considerable part of extracted material (roughly one third) has been
used for land reclamation in Greater Beirut (Dbayeh, Beirut Central District, Beirut
International Airport runway). This part represents more than 30 Mt, which is
equivalent to 8 to 10 years of ordinary Lebanese BTP consumption.

Land reclamation projects in Lebanon are frequent and many of them are under study
in Tripoli, Jounieh, Jdayeh, Saida, etc. Additionally dikes, and marinas are
constructed all along the coastline.

Hence, the effect of land reclamation on the proliferation of quarries must be
systematically evaluated on both the economic and environmental levels. Scars in the
landscapes caused by the quarries left doubt and reservations about the interest, for
example, of the Dbayeh land reclamation for offering only 5,000 dwellings, the
construction of which would have required 4 to 5 hectares of quarries only.
II.7.4 Marine pollution

Seawater quality is very critical. Untreated domestic and industrial wastewater outfalls and intentional or accidental disposal of thousands of tons of solid wastes into the sea induce a catastrophic situation along the seashore, which threatens the seaside tourism, the fishing sector and the coastal ecosystems. Demographic and urban expansion will surely worsen the situation if no protection measures are undertaken.

The challenge is great; it will be necessary, first to stop degradations in order to change the trend and expect an improvement of the coastline situation.

II.7.5 Natural areas

Natural terrestrial areas have been the subject of major deteriorations, essentially due to the break of the natural continuity induced by urban encroachment, quarries, as well as waste disposal in valleys. In the future, the risk would be to see additional urban encroachment on new and valuable natural areas, endangering Lebanon’s most important assets, its attractiveness and quality of life.

Public action however, could provide efficient responses to this challenge. A part of these measures consist of expensive investments in the treatment infrastructure for domestic water as well as wastewater. It is difficult to provide satisfactory infrastructure in a short period of time due to lack of available financial resources. But there is an important part of the responses that have no financial value. They consist of regulatory aspects, especially those that can orient urban settlements towards areas of low environmental risks.
II.8 THE CHALLENGE OF WAR AND PEACE

The last but not least major challenge that Lebanon faces is the Middle East conflict.

This conflict and all its ramifications weigh quite heavily on the opportunities for economic and social development in all the countries of the region, among which is Lebanon.

The economic and social ambitions that Lebanon strives for may be stalled by this conflict and its cyclic crisis.

On the contrary, the establishment of a just and sustainable peace in the region could substitute the security threats and limitations of movement of men and goods by serious economic threats.

Against this conflict and the uncertainties linked to the resolution of the conflict, Lebanon must strengthen its acquired positions and prepare itself for possible changes.

National and Local Stakes

The stakes of war and peace encroach on national economic perspectives as well as South Lebanon’s development opportunities.

At the national level, the constant state of conflict in the Near East restrains, on more than one issue, opportunities for development. The establishment of peace would greatly strengthen the investors’ confidence in the entire region, including Lebanon, encouraging establishment of enterprises, international tourism and trade exchanges. On the other hand, Lebanon and most of the Arab countries of the region might face the competition of a very developed foreign economy, which offers highly efficient port, airport, engineering and tourism services. Because of this competition, Lebanon will need to depend on improving the quality of its services sector as well as on the communication advantages it enjoys with other countries and Arab economic agents.

Regarding South-Lebanon, the constant state of conflict has deprived this region from the traditional exchanges it has enjoyed prior to 1948, with the North of Palestine, and has made out of Beirut and the sea the only gate to new markets. The establishment of a sustainable peace would reinstate the strategic importance of this region mainly through opening the road towards Qoneitra, Safad and Haifa. The economic situation of South Lebanon would then be radically changed.
III

BASIC CHOICES
CHAPTER III

BASIC CHOICES

The ambitions and objectives that Lebanon has set in its Constitution and vocation put an outline for the country’s prosperous and united future, where it would constitute an internationally recognized regional pole that would respect and expose its resources and heritage, and ensure that high quality collective services are provided to its citizens.

The challenges of the future show that these ambitions are not easily achieved, that there could even be risks of deterioration and that only adequate strategic choices would allow overcoming difficulties and reaching the ambitions.

What should these fundamental strategic basic choices be?

Expected responses to the various challenges converge towards three choices that are **unity, balance and rationalization**, as represented in the following table:

**Table 18: Challenges of the future and required responses**

<table>
<thead>
<tr>
<th>Economic development</th>
<th>Reduce production costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Finance</td>
<td>Diversify activities</td>
</tr>
<tr>
<td>Uncertainty of regional conflict</td>
<td>Connect all the regions</td>
</tr>
<tr>
<td>Social cohesion</td>
<td>Rationalize usage of public Finance</td>
</tr>
<tr>
<td>Demographic growth, Urban sprawl,</td>
<td>Reduce costs of public services</td>
</tr>
<tr>
<td>Environment, Needs</td>
<td>Improve competitiveness</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Promote national unity</td>
</tr>
<tr>
<td></td>
<td>Promote solidarities</td>
</tr>
<tr>
<td></td>
<td>Support local economy</td>
</tr>
<tr>
<td></td>
<td>Rationalize the use of land</td>
</tr>
<tr>
<td></td>
<td>Rationalize the use of resources</td>
</tr>
<tr>
<td></td>
<td>Provide the infrastructure required nationwide</td>
</tr>
</tbody>
</table>
Effectively:

- Land use management must promote the unity of the country, economy, society, and territory. It is the major obligation required to confront economic and social challenges of Lebanon.

- Land use management must work to alleviate discrepancies of development between regions, but in the framework of a new, objective and modern conception of balanced development principle.

- Land use management must look for a rational use of the country’s limited resources, particularly natural resources and public finance.

These fundamental choices overwhelm the entire orientations adopted by the National Physical Master Plan at the spatial level, be it in the determination of soil vocations, proposed urban structure, development projects for the various regions, orientations in the field of transport and public infrastructure, urban planning and management of urbanization development or natural resources and heritage management.

Thus, these choices constitute the basic parts of the adopted “management solution”.

### III.1 A UNITARY AND INTEGRATED DEVELOPMENT OF THE NATIONAL TERRITORY

The fundamental choice of an integrated development of the nation is important in order to give more strength to the national economy and counter permanent risks of fragmentation of the national entity. However, this choice is not contradictory with an efficient decentralization at the municipality level.

The National Physical Master Plan promotes a unitary and integrated development which contradicts another vision that consists of concurrently implementing similar regional projects (at the Mohafaza or Caza level for example), thinking that this would be more beneficial and take into account local factors. Such a vision, besides that it would not secure a coherent plan, would contribute to anchoring development inequalities and emphasizing centrifugal tendencies (separation of regions, communities and local economies); its impact on the national economy would have been less advantageous and its impact on public finance much heavier.
The “unitary and integrated” choice could materialize through a series of arrangements:

- Priority to facilities and infrastructures of national importance: harbors, airports, road network, Lebanese University, but also conservation of agricultural, natural and tourism potential of the country, and global valorization of water resources, mountain and coastline.

- A unitary conception of economic development over the entire territory: the economy of cities and distant regions should not be conceived as a sum of similar local economies, but as components of a single national system, in which each region brings its specific contribution. This means that not only agricultural and tourism development will take place in distant regions, but also services and industrial sectors will develop.

- The development of each region of Lebanon (North, Center, East and South) must itself be further unified: large cities being the most prepared to play an economic leading role on behalf of their regions. The unity of development must be organized, in each region, around powerful urban centers. The more economically powerful Tripoli will be, the more the North region will benefit. Economic development will not occur by dissemination of small facilities, but from high investments in the industrial and services sectors.

- Road-links among large agglomerations of the country, among these agglomerations and secondary cities of their rural hinterland and among secondary cities and villages must be significantly improved in order to serve this unitary vision.

- The Lebanese university should no longer be scattered in various branches. Faculties must reunite. They also must be established in 4 campuses in the country, namely the North, Greater Beirut, the South and the Beqaa, each of them having all the faculties, in a way that encourages intermingling of youth.

Nevertheless, LAND management should not be only unitary, but integral as well. Solutions for water services, solid wastes and wastewater treatment must be undertaken with close cooperation between municipalities and all stakeholders. Unions of Municipality will play a major role in the implementation of these solutions and conception of integral development projects over vast territories.
III.2 A POSITIVE DEFINITION OF THE BALANCED DEVELOPMENT PRINCIPLE

The principle of balanced development of regions has to be implemented with more strength, but in the framework of a modern conception of action that avoids anything that could contribute to the fragmentation of the country or to weakening solidarities and complementarities among the cities and regions.

When equality of treatment of regions implies fragmentation of education facilities or creation of power plants in each region to insure autonomy, or administrative divisions intended to reinforce communitarian homogeneity, these actions would work against national unity.

On the contrary, when equality of treatment consists of assuring the same level of basic public services (water, electricity, education, health care, etc.) all over the country, by accepting, and even favoring unity of national level facilities (universities, higher professional formation, energy production, etc.) and their establishment in regional poles, such policy strengthens the purpose of national unity.

Hence, the concept of balanced development of regions adopted by the National Physical Master Plan relates to the following orientations:

- Absolute evenness of treatment of all the regions as far as the quality of basic services is concerned (water, electricity and telephone);

- Development of the entire water resources in favor of towns, industries and agriculture over the national territory;

- Participation of all the regions in the development of the national economy by choosing a complementary development of major national activities over 4 major urban entities: Central Urban Area (Beirut + Mount-Lebanon), the capital of the North Tripoli, the large agglomerations of Beqaa (Zahle-Chtaura, Baalbeck) and the large agglomerations of the South (Saida, Nabatiyeh, Tyre).

- Priority given to the Port of Tripoli for transit shipment towards Iraq;

- Priority given to the development of 3 major industrial zones: north of Tripoli, in the agglomerations of Zahle-Chtaura and between Ghazieh and Zahrani;

- Distribution of the Lebanese University faculties and main industrial zones over 4 areas: Greater Beirut, Tripoli, Zahle, and Nabatiyeh.
- Development of commercial functions of 2 secondary agglomerations, Saida and Jbayl, as the gates of the Central Urban Area towards the South and the North;

- Remarkable development of tourist functions of Baalbeck and Tyre;

- Strengthening of road links between each of the centers and the rest of the surrounding areas;

- Development of the most deprived regions, particularly with the reinforcement of the connection between Hermel and Tripoli through Akkar (highway project between Tripoli and Halba and improvement of the bypass between Qobaiyat and Hermel), between Baalbeck and Hermel (improvement of the existing itinerary), as well as reinforcement of the links from Hasbayya towards the North and South, and between Sir-Denniyeh and the 3 neighboring regions: Tripoli, Ehden and Akkar.

### III.3 RATIONAL USE OF RESOURCES

The Rational use of resources, be it: public Finance, agricultural soil, water, resources of tourist attractions (sea, landscapes, heritage, etc.), existing and future infrastructure and facilities and of course lands in urban as well as rural areas; answers at the same time to the vital need to limit public expenses wherever possible, to secure a better social benefice of resources and to increase competitiveness in various sectors of the economy.

A country’s resources constitute an Asset. To benefit from its advantages, it is important to invest in this asset rather than consume it. This is the rule that should guide the use of resources in Lebanon, be that natural, human, physical or financial resources.

However, when there is no choice but to consume one part of the asset (to offer lands for construction, for example), rational approach consists in minimizing losses (to avoid offering the best agricultural lands or to degrade exceptional sites), or in transforming this part of the consumed asset to another type of asset (a well-fitted construction that would enrich the landscape).

**To know how to use natural resources**

The main natural resources of Lebanon are water, sites (mountains, valleys, coastline, etc.), agricultural lands and natural vegetation (forests, etc.). Being limited, their rational use is more than vital.

These resources play an important role in the quality of life, agricultural productivity and tourist attractions. It is necessary to avoid their dilapidation and, on the contrary, use each of them in the most profitable manner.
Water is a rare resource in the Middle East and Lebanon has the “gift” of being more endowed than its neighboring countries. Nevertheless, enormous efforts are needed in order to control its use and preserve its quality. Lebanon has to carry out this task in a productive approach, aiming at a better quality of life for citizens and a higher productivity of agricultural lands. There is a large consensus upon this national objective. It is therefore essential to find ways to realize it.

Remarkable sites (mountains, valleys, landscapes and coastline) and natural areas (especially forested zones) constitute in Lebanon a unique asset that must be used for improving the quality of life and the tourism economy. The use of sites, as resources, should avoid their degradation. Conflicts of uses (on the coastline, mountains, etc.) should be regulated in a way best suitable for the sustainable valorization of this asset. In particular, all forms of pollution are to be avoided, whether it is solid or liquid wastes, or “visual” pollution (obstruction of views, mediocre architecture, degraded or ruined construction, etc.).

Lebanon’s agricultural lands are among the most fertile lands in the Middle East. Moreover, they provide a large diversity of location and exposure (latitudes, elevations, coastal zones and interior plains, etc.), which allows cultivating a large variety of produce. The best lands constitute a national asset that should not be dilapidated.

What applies to water resources, sites and soils is generally applicable to the entire national territory. In fact, Lebanon is a small territory that is densely populated. The population density is even one of the highest in the world (11th rank). It is essential to ensure, in this small territory, the necessary functions required for the life and activities of the 4 million people of Lebanon (more than 5 million in 30 years from now).

But there are various constraints: only 39% of the territory is beneath 800 m of elevation and 35% is located above 1,200 m. The length of the coast is less than 250 km long. The scarcity of the “land” resource compels to organize its use in a reasonable manner and, before all, its economy. The objective must be not to waste areas that are most adequate for a given activity, by using it for another one.

To save public funds

For almost twenty years, Lebanon has been characterized by very costly multiplication of various forms of urban development, especially isolated construction, away from existing districts or villages.

Such forms of development induce growing expenditures for network extension (water, wastewater, electricity and telephone) and even major facilities displacement (reservoirs, pumping stations, transformers, etc.), road network maintenance and solid waste collection. Taking into consideration the limited public finance, Lebanon could no longer be a burden on the State and the Municipalities for such kind of avoidable expenses. Most countries in the world, including developed ones, have implemented policies aiming at
Reducing forms of urbanization that could be costly for the Community, or make investors contractors bear induced direct or indirect expenses. Public welfare must meet this path.

In this framework, investment programs assume a major importance, where criteria for project selection must be refined: financial budgets allocated for different sectors must be better calibrated to satisfy the needs of sector by sector. The choices of projects within one sector must, without exceptions, promote the performance of existing installations in favor of new projects.

To know how to use other resources

The same approach is valid for all types of resources in the country, starting with the first primary resource, the human resource. Lebanon must encourage the use of its labor force in professions they have trained for, and try to resolve all the problems that lead the young generation to emigrate. An active person who lives and works in the country would contribute far more to the national economy than a one who has emigrated, even if the latter transfers money to his or her family in Lebanon.

As for physical resources, such as transport infrastructures and others, they must be used adequately: a highway must help reduce the distances and transport time between two cities. However, its use as a commerce boulevard might generate traffic obstructions, and increase transport time from one place to another that increase these distances. Profit of the commerce activity for a small number of people could not compensate for the economic loss induced by these obstructions.
IV

THE PERSPECTIVES OF THE
NATIONAL PHYSICAL PLAN
CHAPTER IV

THE PERSPECTIVES OF THE NATIONAL PHYSICAL MASTER PLAN

With the three fundamental choices of unity, balanced development and rationalization of expenditures, the major guidelines of the National Physical Master Plan are presented in 8 points:

1 - Structure the territory around the major urban centers;
2 - Associate all regions to the national economic development;
3 - Distribute the major public facilities in an effective and integrated manner;
4 - Unite the territory with an efficient and developed transportation network;
5 - Insure an urban development of good quality, respecting the characteristics of each region;
6 - Highlight and benefit from the natural wealth of the country;
7 - Exploit the water resources in a sustainable way; and
8 - Resolve efficiently the problems of quarries, wastewater and solid wastes.

IV.1 STRUCTURING THE TERRITORY AROUND THE MAJOR URBAN CENTERS

The general economic performance of the country depends largely on the strength of its cities. When the economy is getting more dependent on the tertiary and industrial sectors, the cities would play the driving force role in the development of the regions and state.

This economic necessity meets with the objectives of a balanced development (at the large regions level: North, East, South) on one hand, and of unity and integration on the other. The dynamism of the cities is a prerequisite for the global development of the surrounding regions. Cities are also the place where different social classes intermingle, exchange and meet with each other.

The choice of a major role for large cities meets as well with the concern of preserving the character of the rural areas, villages, natural zones and major agricultural areas. Construction would be allowed at a specified density, which limits urban encroachment on other areas.

For large cities to play an effective leading role in the development of their regions, the National Physical Master Plan advocates a general structure where major agglomerations interact with the surrounding villages, particularly through a series of
small “relay-villages” that secure administrative, commercial and service functions for a number of villages.

This interaction would ensure that sufficient income is guaranteed to the rural regions for the population to stabilize in place and develop its life conditions.

**IV.1.1 Proposed urban structure**

The proposed structure consists of an urban system that should operate as the organs of the same body. Its components are:

The major agglomerations are:

- The Central Urban Area (Beirut and the Mount Lebanon);
- Cities located at the gates of this Central Urban Area: Jbayl and Saida;
- The large metropolis of the north: Tripoli;
- The metropolis of balance (growth centers): Zahlé-Chtaura and Nabatiyeh; and
- The large patrimonial cities: Baalbeck and Tyre.

The rural regions consist of:

- The relay-villages; and
- Other localities.

Today, the major agglomerations (the ones with more than 40 000 permanent residents) account for two thirds of the country’s population. The National Physical Master Plan adopted maintaining this proportion for 2030, which means stabilizing of population between cities and villages. Among the major agglomerations, the relative weight of the “Central Urban Area” should decrease. It would diminish from 40% of the population to 35%, under the dual effect of an objective factor namely a lower natural growth rate, and a subjective effect, which is the will to strengthen the country’s other major agglomerations.

The rest of the territory (one third of the residents in more than 1 000 localities) will be planned around significant urban centers: the North and Akkar around Tripoli; Beqaa and Baalbeck-Hermel around Zahlé-Chtaura and Baalbeck; the South and Nabatieh around Saida, Nabatiyeh and Tyre; and the highlands of Mount Lebanon around the Central Urban Area.

Interconnections with the rural world are assured through the network of Relay-villages that would be the centers of services and commerce directly accessible from the surrounding villages.

The other localities of the rural world would experience a development based on diversification of their sources of income: besides agriculture and public
employs, it is necessary to reinforce trade, services, tourism and summer holidays activities.

**IV.1.2 Urban structure in the North and Akkar**

In the North and Akkar, the agglomeration of Tripoli has presently 48% of the population, whereas the small cities and villages of the area account for 52% of the population. The share of the agglomeration could increase in 2030, with the current growth of urban development, but the rural area will maintain almost half of the residents (the two Mohafazas combined).

Within the rural areas of the two Mohafazas of the North, some villages, being more important than others, will play the role of relay-villages. There are 14 “relay-villages” in the region, of which 9 are in the North, and 5 in Akkar:

- For the coastal area of Batroun: Batroun
- For the high area of Nahr el-Jaouz: Tannourine Tahta
- For Koura: Amyoun
- For the region of Qannoubine: Ehden and Besharreh
- For the region of Zghorta: Zghorta
- For the region of Danniyeh: Sir
- For the North coastal area: Minieh and Aabde
- For lower Akkar: Halba, expected to be the administrative center of the Mohafaza of Akkar
- For middle Akkar: Beyno
- For higher Akkar: Fnaydeq
- For the region of Qobeyat: Qobeyat
- For Wadi Khaled: Chadra

**IV.1.3 Urban structure in Beqaa and Baalbeck-Hermel**

The group Beqaa + Baalback-Hermel is today the area with the lowest urbanization rate: only 34% of the population of the Beqaa live in the two major agglomerations, Zahle-Chtaura and Baalbeck. This proportion of “city dwellers” is likely to increase because of tertiary activities and industrialization, but in reasonable rates. In 2030, especially with the strengthening of the metropolis of balance of Zahle-Chtaura-Qab Elias and the expected tourism boom of Baalbeck, the proportion of the inhabitants of major agglomerations could exceed 40%.

Despite the urban development, the majority of the population of the Beqaa and Baalbeck-Hermel will continue residing, in 2030, mainly in small cities and villages. These towns will be organized, for the local life, around 11 relay cities:
For the region of Hermel-Qasr-Fissane: Hermel
For the region of Ras-Baalback: Laboue
For the region of Deir-el-Ahmar Yammoune: Deir-el-Ahmar
For the Beqaa center West :Chmistar
For the Beqaa center East: Brital
For the region of Rayak: Rayak
For the region extending from Bar-Elias to Masnaa: Majdel-Anjar
For the region extending from Kamed-el-Laouz to Qaraoun: Joub-Jannine
For the region extending from Aammiq to Aitanite: Saghbine
For the region extending from Machghara to Maydoune: Machghara
For the region of Rachaya: Rachaya

Among these different relay-cities, the development of Hermel in the North will be given particular attention, given the economic and social difficulties that the entire Caza is experiencing.

**IV.1.4 Urban structure in the South and Nabatiyeh**

The South consists of three major agglomerations: Saida, a harbor-city between the South and Beirut; Tyre, a patrimonial city with a remarkable natural and agricultural framework; and Nabatiyeh, the dynamism of which continues and is expected to play an even more important role in the future.

In total, these three agglomerations gather 44% of the resident population of the two Mohahafazas of the South. This proportion is expected to rise up to 48% due to the increase in tertiary works and industrialization.

The balance between the three poles of the South should be assured by a distribution of complementary functions: trade in Saida, tourism in Tyre and higher education in Nabatiyeh. It is also important to reinforce particularly the pole of Nabatiyeh in order to alleviate urban pressure along the coast. It would be more adequate to locate a major industrial zone of national interest, mid-way between these three poles, at Zahrani eventually supported by a commercial port.

Rural and summer holiday areas of the South will be organized locally around 12 relay cities:

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1 The city of Bar-Elias, which has been significantly developed the last few years, has become the most important on the Beirut-Damascus axis. Nevertheless, it is located in a flood prone area, in the middle of the agricultural plain: this is why Majdal-Anjar has been selected as relay city instead of Bar-Elias.
2 This proportion is however around only 30%, if Palestinian camps should be excluded.
3 Around 33% Palestinian camps excluded.
– For the region of Hasbaya: Hasbaya
– For the region of Marjaayoun: Marjaayoun and Khiyam
– For the region of Kfarkila-Aadaysseh: Kfarkila
– For the region of Jezzine: Jezzine
– For the coastal zone between Saida and Tyre: Sarafand
– For the plateau of Nabatiyeh, between Nabatiyeh and Zahrani: Insar
– For the hinterland of Tyre: Jouaya
– For the region of Cana: Cana
– For the region of Bent Jbayl: Bent Jbayl and Tebnine
– For the region of Naqoura: Naqoura

IV.1.5 Urban structure in Greater Beirut + Mount Lebanon

Central Urban Area

The term “Central Urban Area” is used to designate an urban entity composed of 3 concentric spaces:

– The city of Beirut;
– The first ring: between Dbaye and Khaldeh, below 400 m of altitude; it is the remaining part of “Greater Beirut”;
– The second ring: it consists of the agglomerations of Jounieh, Bikfaya, Broummana, Aaley and Damour.

This urban entity constitutes, and will more in the future, an integrated functional unity requiring coherent solutions in all domains: transportation, sewage, solid waste, green spaces, etc…

Beirut and the first ring

The group of Beirut + First ring, which accounts nowadays 1.3 million residents, is indisputably the economic, social, cultural and political center of Lebanon. It is the main place where most activities are concentrated: commercial, financial operations, transport, industry, tourism, hotels, general and higher education services, cultural creativity, government administration, and headquarters of political authorities and diplomatic councils. It is also the center of transportation and transition in the country, due to the Port of Beirut, the Beirut International Airport located in the southern suburbs, and the highways to the North, East and South that link the center to all other Lebanese regions, to Syria and therefrom to all other countries of the region.
This “main region” will keep on playing a primary role in the forthcoming Lebanon, despite the efforts of re-balancing in favor of other regions. The objective would be to search for quality rather than quantity: organize the existing functions better, earn competitiveness among the major metropolis of the Near East, and enhance the structure and conditions of life.

The second ring

The main challenge for the Central Urban Area is to organize the second ring to accommodate the future demographic and urban growth of the whole Central Urban Area.

It would be convenient to strengthen the urban poles of this second ring to play a role of relay-cities in these half-urban and half-rural regions. This role will be allocated to the following cities:

- For the coastal zone of Kesrouane: Jounieh
- For middle Kesrouane: Aajaltoun
- For the upper northern Matn: Bikfaya
- For the upper southern Matn: Broummana
- For the region of Baabda: Baabda
- For the upper Aaley: Aaley
- For the coastal zone of Aaley: Aaramoun
- For the coastal zone of Damour: Damour

Small coastal agglomerations: Jbayl-Aamchit and Barja-Chehim

Beyond the second ring of the Central Urban Area, Mount Lebanon includes two other important agglomerations: in the North, the agglomeration of Jbayl-Aamchit and in the South the agglomeration of Barj-Chehim-Jiyeh.

The agglomeration of Jbayl can be considered as the gate that separates the central urban area from all the North of the country. Jbayl is also the chef-lieu of the area that plays an important role in its relations with the villages the Caza of Jbayl, as well as those of the neighboring Caza of Batroun; it is also a dynamic city, regrouping various activities and functions (trade, services, tourism, agriculture market, industry, etc.). It is thus, essential that the extension of the Central Urban Area towards the North would not affect the identity of Jbayl. This requires managing the urban agglomerations in the south of the city, by creating a natural separation zone to limit the city’s expansion.

The agglomeration of Barja-Chehim is less organized: it is the result of a quasi-continuous urban sprawl on the axis that starts from the coast up to Chehim, as well as the equally important expansion of Barja; the two tending to join along the coastal line as well as in higher areas. This agglomeration is currently being constituted. It
should get additional attention from the Authorities to encourage the establishment of new activities and structure the urban growth in a proper way.

Rural regions of Mount Lebanon

Rural regions of Mount Lebanon are located on the hills, overlooking the central urban area and the agglomerations of Jbayl-Aamchit and Barja-Chehim. They are the hills of Jbayl, Kesrouane, higher Matn, higher Nahr Beirut valley (Caza of Baabda), Bhamdoun (higher Nahr Damour valley) and higher Chouf. These regions are relatively less populated than others – their permanent residents represent less than 15% of Beirut + Mount Lebanon.

They would need specific policies to stabilize their population offering all year round activities and avoiding their transformation into “dormitories”. As in the other Mohafazas, this policy requires the support of many relay-cities, in terms of services and facilities. The proposed relay cities for these regions are five:

- For the upper or Nahr Ibrahim: Qartaba
- For the upper mountain of Kesrouane: Mayrouba
- For Bhamdoun: Bhamdoun
- For the upper Chouf: Beiteddine and Baaqline.
Figure IV.1: Urban Structure Principle

National level:
Network of Major Agglomerations
- Major agglomerations of Beirut Central Area and Tripoli
- City gates of Saida and Jbail
- Metropolis of balance of Zahle and Nabatiye
- Cities of patrimonial dominance of Sour and Baalbek

Local level:
Network of Relay-Cities
- Relay-cities capitals of Caza
- Relay cities

ville porte: Saida
ville porte: Jbail
ville patrimoniale Sour
ville patrimoniale Baalbek

Aire urbaine centrale

Beyrouth

metropole d’équilibre
Zahle

Chtaura

Nabatiye

High mountain: major physio-sedimentary obstacle
Lebanese university, main campus
Zone of major activities
Gaz power plants
Hydrocarbon depots

Area of influence of agglomerations
- Major
- Sub-sectors

Cuts of continuous urbanization of the coastline
IV.2 INTEGRATING ALL REGIONS INTO THE NATIONAL ECONOMIC DEVELOPMENT

Since all sectors of the economy are currently confronted with international competition, the aim should be to integrate the activities of all cities and regions into the heart of the economic system.

This implies necessarily that strong service and industrial centers should emerge in different regions, other than the only Central Urban Area. Important agglomerations in the North, South and East, would have priority in benefiting from this policy.

Associating all the regions to the national economic development is valid not only for industrial activities, commerce, and office service activities, but also, for tourism, which still remains excessively concentrated within Beirut, Jbayl, Jounieh, Broummana, Aaley and Bhamdoun. A tourism project, covering the whole of the Lebanese localities, with all regions having something to offer and a benefit to gain, should also be put into action.

In general, the works on development of rural regions should be equal to that of large cities. Villages would not be able to compete with the cities due to the absence of certain economic and social functions that require the proximity of a large and dense clientele, or depend upon the concentration of enterprises acting in concordance with each other. However, villages can offer services that cities do not have, mainly those related to the quality of their life and their environment; thus villages should emphasis this advantage to attract additional income.

IV.2.1. Organizing the distribution of activities within the Central Urban Area

The Central Urban Area has the essential national and international tertiary functions of the country. It is also the place of concentration of industry and most of tourism activities. Within this important zone, the stake lies in organizing the distribution of those functions: financial center, business centers, port and airport activities, large scale trade, central administrations, hotel sector, industries, etc.

A moderate and mostly qualitative growth of these functions should be sought. But, in no way should the growth of this center be accomplished at the expense of other alternative territorial choices.

An organization to be completed

Organization of the central functions in the capital region has greatly progressed due to the projects launched in the 1990’s, namely the modernization of Beirut Port, Beirut down-town, reconstruction of the airport, improvements of the road network and local developments as noticed in the peripheral centers, namely Jounieh, Zouk, Aaley and elsewhere.
Other projects can complete this organization. Some are already planned such as the development of the Hadath university campus or the development of public facilities at Bir Hassan or even the development of the touristic activities along the southern coast within the framework of the Elyssar project.

Establishing office centers

Other projects may also be usefully explored in the tertiary services sector such as the development of offices district at strategic locations that were identified by the National Physical Master Plan for the region of Greater Beirut: Nahr El Mot, Hazmiyeh, Khaldeh… Within this perspective, it is worth rethinking the concept of suburbs considering it as a central axis structuring the metropolitan area, rather than a passageway of the transit traffic.

Redeployment of industrial activities

Concerning the industries, an important work of putting things back in order is necessary to reduce the damages and dangers resulting from certain industries established within the heart of inhabited neighborhoods or in their immediate surroundings. This reorganization work should be an opportunity to modernize the industrial sector by creating new and modern zones of activities. However, abolishing certain old industrial areas might also help in adopting a policy for equipping surrounding neighborhoods as well as a more ambitious housing policy targeting young households.

Diversification of the activities in the second ring

Economic activities of the cities and villages of the “second ring” are strongly based on tourism and leisure: Aaley, Broummana, Bikfaya, Jounieh are important tourism and summer vacation centers. However, other activities, diversifying job offers and income sources are also present, such as industry (Zouk) or service in the sectors of education, health…. This diversification should be encouraged while avoiding the alteration of tourism potential in these regions, which remains their important economic asset.

Finding solutions for the transportation sector

Economic activities in the Central Urban Area might be seriously impeded by road traffic congestion problems. It is also important, in the interest of the economy of Beirut, to propose creative and modern solutions to this major challenge, particularly through reorganizing the outdated public transportation system, which currently accentuates the road congestion instead of reducing it.

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4 Multiplying means of public transportation of limited capacity has negative effects of the road congestion. The current service is characterized by its social effects (transportation at low prices, income distributed to a high number of personnel). A more efficient public transportations service should be based on vehicles (buses or trains) of greater capacity with less authorized stop points.
Controlled Development of Tourism in the High Mountains

At the periphery of the Central Urban Area, natural and rural regions of the high lands (high lands of Kesrouane, Matn, Baabda, Aaley and Chouf) can benefit from the proximity of the large pool of job opportunities offered by large agglomerations as well as from activities they could develop starting from their own potential, essentially in the fields of tourism (in all its forms: summer vacation, hotel industry, winter sports, cultural tourism, eco-tourism), services and local trades. They will also be able to continue to exploit their agricultural potential, whether it is the orchards in high mountains, garden vegetables in the lowlands, or intermediary agriculture where the diversity of the altitude levels allows a large spectrum of agricultural varieties.

Within these rural regions surrounding the Central Urban Area, the relay-cities will play an essential role in the services and trade sectors. These cities will benefit from the establishment of public administrations as well as educational and health facilities.

IV.2.2 Giving the North and Tripoli a place of choice in the maritime transportation, industry, tourism, international fairs and higher education

Most of public efforts over the coming years should be concentrated in the North and Akkar, to rectify an economical and social situation, which is among the most alarming of the country.

Naturally, the effort should be directed towards cities as well as villages. But the North will have fewer chances to benefit from a real economic take-off if its urban heart, the agglomeration of Tripoli, does not acquire in the first place sufficient dynamism.

A particular effort for Tripoli

The development of the agglomeration of Tripoli should be accomplished in an orderly way, tackling all sectors within a project framework.

The Port of Tripoli should not only be rehabilitated and modernized, but should benefit from a strategic decision to give it the exclusivity of transports of freight towards and from Iraq and Syria. By putting back in the railroad service to Syria (and later on to Beirut) which necessitate improving the roads towards the border on one hand and Beirut on the another, Tripoli might be able to develop an important function of freight transport. This function should be strengthened by the provision of warehouses and adequate logistic zones.

The industrial development of the capital of the North should also be a priority. It can benefit from the presence of the port and communication roads, the development of the power generation site, the competitive prices of industrial lands as well as the local industrial traditions.

However, Tripoli and its agglomeration should mostly rely on the development of its trade and services. And, in this context, Tripoli possesses real assets, which are worth
emphasizing. It is particularly convenient to insist on the development of the city’s image of openness both on the symbolic and functional levels.

The activity of international fairs might be developed once again if the national will to give back the priority to Tripoli in this matter is regained. This development would require some investments and vigorous promotional action. This action could be centered on products of the manufacturing industry.

Tripoli also deserves, because of the demographic weight that the North represents, to become a complete university center. Faculties of the Lebanese University might be completely relocated there, hence receiving students coming from all over Lebanon.

Tourism might bring an additional noticeable income to the city and its region. Constructed around the exceptionally-built heritage of the city, its culinary traditions, crafts and musical traditions and the very beautiful sea façade of el Mina, and as a starting point towards the natural summer vacation destinations to all North Lebanon, the tourism project of Tripoli should ultimately lead to the development of the hotel management sector, at least for short stays.

The project of the overall economic development of the agglomeration of Tripoli needs to be followed-up by a local development agency. It should be conducted in parallel with the project of social development in Lebanon and raising the level of urban services in order to reach an equal standard to that of Beirut.

**The expected dynamism in the North and Akkar**

A renewed dynamism of Tripoli will give a new start to the entire economy of the North and Akkar. Rural regions, better connected with the capital of the North, and also with Beirut and the Beqaa, will be able to develop complementary activities to those of the Capital Beirut.

These regions have undisputed assets to do so: other than the agricultural wealth of Akkar and Koura, which might be the very basis for the development of modern food processing industries, the North has important and diverse assets related to tourism, which are mostly under-exploited: a valuable sea façade between Tripoli and Jbail; Qornet Saouda’s snow covered slopes (winter sports); forests and natural wealth of all the mountain (summer vacation, eco-tourism); pilgrimage sites (holy valley of Qadisha); striking villages and splendid landscapes; etc.

Emphasizing these assets needs local development projects, concurrently with what is taking place in the agglomeration of Tripoli, within the framework of “opportunities of life”: the “Batroun countryside”, the upper valley of Nahr el-Jaouz, the valley of Qadisha, Amioun and Koura, the region of Danniyeh, Halba and the Akkar plain, the upper Akkar, the region of Qobeyate, the region of Wadi Khaled…
IV.2.3. Giving a new boost to the two large metropolis of balance: Zahle-Chtaura and Nabatiyeh

Straight after the North and Akkar, the priority for economic development should be given to the two “metropolis of balance”, which are the agglomerations of Zahle-Chtaura and Nabatiyeh.

These two agglomerations have in common their geographic location; they both are in the hinterland of the East and the South of the country. Their development would allow reducing the pressure exerted on the coastline.

This development should be conceived based on the traditions of these agglomerations: agricultural, commercial and administrative. However, it should also include a part of voluntarism, which would allow them to have a higher rate of growth and development.

Giving these agglomerations the status of major centers requires strong measures: a new distribution of the branches of the Lebanese University, all faculties should be located only within the campuses of these two agglomerations; installation of several consular bodies (Syndicates, Chambers, etc.); lead projects, such as giving the label of the capital of food processing industry of the country to Zahle-Chtaura and the label of some other kind of activities, such as culture, publication, environment, etc., to Nabatiyeh.

In parallel, incentives should be given to the industrialists to encourage them to settle near these two agglomerations.

Zahle-Chtaura

The agglomeration of Zahle-Chtaura has strong assets. The required public intervention should be prospected towards space organization and decentralization of governmental functions. Road works, mainly the separation of local and transit traffic in Chtaura, urban planning (development of the North-East sector), logistic and industrial settlements, and regulations related to sewage and solid waste, would allow giving a new boost to this agglomeration that could be further supported by the existence of a university campus with complete faculties.

Additionally, establishing a modern industrial zone towards Rayak, half-way between Zahle and Baalbeck, and well linked to the road network and with a good access to the railroad to Damascus, would constitute a motivating project and would bring a real increase in job opportunities and wealth to this entire region.

The development of the central agglomeration of the Beqaa will bring further dynamism to all the Mohafaza. The rural regions would indirectly benefit from the development of Zahle-Chtaura by developing their own potential, generally founded on their exceptional quality of life – mainly in the West Beqaa and Rachaya. Support for summer vacation and tourism development, trade and local services, as well as agriculture will certainly follow.
The development of the large agglomeration should in-effect allow the preservation of the rural character of regions located in the periphery. West Beqaa could remain a peaceful region with its splendid sceneries of large agricultural lands and the Qaraoun Lake, where a moderate tourist activity could be developed concurrently with diversifying activities mainly centered in the important small cities of Machghara, Saghbine, and Joub-Janine. These small cities could host primary service industrial activities, health and education services, as well as small non-polluting industries. The group of cities and villages of this Caza should also benefit from job opportunities, which would be created in Zahle and Chtaura due to a more efficient transportation network.

The same logic should prevail for the region of Rachaya. Organized around the city of Rachaya, this region might witness a development and dynamism of its activities due to better road links with Hasbaya and the South on one hand, and with Masnaa, the Syrian border and Zahle-Chtaura on the other. Ultimately, Rachaya will be able to develop its major tourism asset, which is Mount Hermon.

**Nabatiyeh**

The agglomeration of Nabatiyeh, another “metropolis of balance”, does not benefit from similar assets, that exist in the case of Zahle-Chtaura. The fact of giving it the status of “metropolis of balance” is a voluntary decision, and it will take a lot of efforts to bring up this city to the desired level. Nabatiyeh has already the status of the administrative center of the Mohafaza. It is also an active commercial center, as well as medical (5 hospitals of which 1 is public), social (about 20 institutions), cultural and educational services center. Industries are still underdeveloped (mainly metalwork and BTP) as well as tourism and leisure. The development of Nabatiyeh requires diverse efforts aiming at attracting enterprises and improving the attractiveness of the standard of life. Urban planning and improvement of infrastructure facilities will be most decisive.

The establishment of a large industrial zone in Zahrani, at the crossroads between Saida, Nabatiyeh and Tyre, should be accompanied by launching housing projects in Nabatiyeh to encourage the settlement of the young industrial workforce in this “metropolis of balance” rather than the coastline.

The development of Nabatiyeh, in parallel to the development guidelines adopted for Saida and Tyre (discussed hereafter) will reinforce the economic situation of South-Lebanon as a whole. The improvement of the road link Zahrani-Nabatiyeh-Marjaayoun-Hasbaya-Masnaa, and the improvement of the secondary road links between Bent Jbayl and Nabatiyeh on one hand and Tyre on the other, will contribute to this objective.

Outside of the three major agglomerations of the South, the cities and villages will exploit at their best their own potential, based on local services, tourism and the offer of high standard housing near the centers of job opportunities.

The regions of Marjaayoun, Khiam, Rihane and Hasbaya will profit from the dynamism that would be created in Nabatiyeh, and from the substantial improvements...
proposed by the road link between Nabatiyeh (in fact, starting from the coast) and Masnaa, going through Marjayoun and Hasbaya. Other than the local development projects conceivable within these regions (small food processing industries, diverse services, summer vacation...), they could also benefit from the flow of people and goods, which may develop on this itinerary. Ultimately, the reopening of links towards Qoneitra and Palestine would provide the region of Marjaayoun with opportunities for commercial development.

IV.2.4 Basing the economic activity of Saida and Jbayl on the flow of people and goods

Jbayl and Saida have a particular geographic position. They are near the Central Urban Area but not truly part of it. These two cities would act as “gate cities” that separate the Central Urban Area from the remaining parts of the country. Saida is the access point of Beirut towards the South and vice versa. Jbayl is the access point of Beirut towards the North and vice versa.

Each of these cities will be able to take advantage from this situation, which relies on the flow of people and goods at the entries of the Central Urban Area. The tourist and commercial functions could be supported by an important logistic role, such as vegetable production and storage, warehousing and transportation of industrial goods.

Saida

Saida has many assets: its status as the administrative center of the Mohafaza; and well developed commercial functions, sea front historical heritage, and culinary traditions, make it a major tourist destination. It is also accessible to the agricultural activities of South-Lebanon... However, the city might suffer from its proximity to Beirut (less than half an hour), both on the economic as well as cultural and leisure levels. Saida has therefore every interest to develop its specific assets, its tourist functions and, most importantly, its commerce, including fish and agricultural products.

This requires emphasizing the city’s assets: its sea façade, its historical heritage, souks, crafts, public services, agricultural plain, etc.

The industrial development of the agglomeration, mainly noticeable in the South of the city, should be better managed. The proposal of the National Physical Master Plan to create a national industrial zone of interest towards Sarafand might constitute an opportunity to reorganize the existing activities in Ghaziyeh.

Saida possesses also an important residential potential with its prime sites overlooking the sea and which already host important real estate residential developments. The preservation of this asset requires good management of the prospects and the scenarios, mainly the safeguarding of buffers between the hills and the lower city as well as a good regulation of the building heights on the foothills to preserve this beautiful view of the greeneries.
Saida hinterland, between the coast and Jezzine, can develop activities mainly linked with summer vacation areas. With the expected demographic growth in Saida, it is possible to conceive more ambitious projects in terms of leisure activities offered to the population over the foothills. However, above 900 to 1000 meters of altitude, it is less probable that activities other than summer holidays and local services might take place. The city of Jezzine would then be the main beneficiary, due to its administrative and commercial role.

Jbayl

Jbayl’s situation is similar to that of Saida. Although, it has a smaller population, the city has stronger assets in tourism (Phoenician and Roman ruins, beaches, old neighborhoods…), and a zone of commercial attraction extending all over the Caza and beyond.

Jbayl’s main threat is the even greater proximity to the Central Urban Area, which is extending northward. If the current urbanization rate continues, it would reach Nahr Ibrahim within the coming 20 to 30 years. Jbayl and its agglomeration, including Aamchit, should defend their identity and remain independent cities rather than parts of suburbs. To do so, Jbayl should more than ever develop its tourist and commercial functions, including that of agricultural products.

Jbayl’s development should be accomplished through safeguarding its potential and highlighting its value: it needs to avoid the temptation of land reclamation whose damages are visible in many locations along the northern coastline: it needs to protect the sandy beaches, the sea view from the archeological site, the old port and the old town… This is what constitutes its assets, and its capital.

In the Jbayl hinterland, the industries on the near-by sites could be maintained and strengthened, while respecting the protection of groundwater. The distant villages can, on their part, develop activities related to summer vacations. The valley of Nahr Ibrahim could also conceive developing activities entirely related to tourism due to its impressive landscape value. However, this should be adequately controlled to avoid altering its important landscape asset.

**IV.2.5 Developing Baalbeck and Tyre based on their universally famous heritage**

The two cities of Baalbeck and Tyre host the two largest archeological sites of Lebanon, both cited on the world heritage list. This asset as well as the geographic location of the two cities allows their particular distinction as major heritage centers of the country.

Other cities are also known for their archeological and heritage wealth, particularly Jbayl and Saida, but also Tripoli and Beirut, and tens of other cities and villages. These can fully benefit from this wealth, even if they haven’t been designated as “major heritage centers” of the country. In fact, this distinction of Baalbeck and Tyre should be the dominant orientation to the development of both cities, something which holds advantages but also constraints.
Baalbeck and its region

Baalbeck owes its international fame to its exceptional archeological site. This heritage wealth endows it with a considerable tourist attraction power. This should be well exploited to the benefit of the inhabitants of the city and the region. The goal should consist to make out of Baalbeck a hosting center for mass tourism, with short-term lodging opportunities allowing visitors to cruise from Baalbeck, towards the canyons of Aassi in Hermel, the sceneries and sites of Yammouneh and Ainata, the Cedars, the restaurants of Zahle and the caves of Ksara, etc.

For such a project to succeed, the city of Baalbeck should solve a number of problems related to urban services, be successful in developing links between the city and the archeological site, preserve the outskirts of the archeological site, efficiently manage traffic, parking and commerce – particularly the food commerce on public roads –, attract hotel investors, organize its promotion with the tour-operators and develop its image of openness.

All this should be conducted in parallel with strengthening of Baalbeck’s essential functions as a major trade and services center in all of the North Beqaa, and as the most important inhabited location in this entire region. Confirming its status as the administrative center of a new Mohafaza would contribute attaining these objectives.

Baalbeck and the region of Baalbeck-Hermel should also benefit from the project of establishing a large modern industrial zone around Rayak. The jobs, which will be generated in this zone, added to those of trade, tourism and agriculture, will allow keeping in the region the active youths who will soon find themselves in the work market.

Beyond the center of Baalbeck, North Beqaa remains marked by the agricultural activities that occupy a major status, an activity which should be further modernized and further supported with appropriate projects: developing irrigation while taking into consideration the soil’s fragility (drip irrigation being the most recommended in the plain around the Aassi), in addition to a better management of marketing activities related to agricultural industries management of pastures and resolving real estate issues (distributing properties in shares), etc.

At the same time, it is important to introduce in this region other activities to diversify and raise the income level of the inhabitants. Programs for local development of this region have been studied. They provide a primary platform for work but show at the same time the necessity of a stronger government commitment to help this territory to come out of the social crisis that resulted from the eradication of illegal cultivations, and whose effects persist. Development projects to be launched in the region should, in all cases, consider its characteristic risk of “desertification”, that is now aggravated by a poor management of natural resources caused precisely by the low level of incomes.
Tyre and its region

Tyre has tourist assets that are even more diverse than those of Baalbeck. Two internationally known monumental Roman sites, a Phoenician history, an important position within the history of Christianity, an open door to all heritage – Arab, Crusades, Roman, religious – disseminated all over South-Lebanon, immaculate sand beaches a preserved nature in the surroundings, a traditional picturesque port, etc.

All these elements endow Tyre considerable opportunities for tourism development. Like Baalbeck, exploiting this potential necessarily goes through a series of regulations to organize the urban environment and protect sites and increase investment in hotel, in addition to development of media. Concurrently, Tyre will be able to continue developing its other activities, particularly trade and services, in the context of its hinterland and its required services.

Tyre hinterland has precisely enough assets to benefit from results of reinforcing the economic activities of Tyre itself. Its historical remains are very numerous and some are gaining popularity such as Cana’s or the citadel of Tebnine. Likewise, the preserved nature of the countryside of Naqoura and the characteristic landscapes of the “Hills of the South” are additional tourist attractions.

The South has also other assets, as demonstrated by the example of Bent Jbayl, a city of trade, industry and services, which has recovered its dynamism shortly after the end of the occupation. In the surrounding cities and villages, the irrigation water supply project through the conveyor 800 will allow the increase of agricultural income and the visible improvement of living conditions.

### IV.2.6 Diversifying income resources of rural area

If the economic prosperity of the regions primarily depends upon the dynamism of its large agglomerations, it is equally important to conduct specific local development projects for the rural regions, where one out of three Lebanese resides all year long (and also one Lebanese out of two in summer weekends). The increase of the income resources of permanent residents in rural areas could be achieved through the diversification of those resources.

Knowledge of the history of rural areas and their evolution are essential factors for appropriate future planning.

Historically, rural areas were the dominating place of residence and work in Lebanon. The sources of income of this rural Lebanese society were essentially agriculture and crafts.

By mid of 19th century, cities began to prosper commercially due to improvement of communication means, and the increased opportunity of new services related to education, health, teaching, and leisure. The urban way of life started developing. The prosperity of cities, the attraction of their way of life and the reduction of the demand for agricultural labor due to mechanization led, as in many countries, to a massive rural exodus. This was slow at the beginning, but accelerated because of the important
difference in income between the agricultural world and the world of the large city – mainly Beirut. This was very well described in the IRFED mission reports at the beginning of the 1960’s.

The rural exodus has undoubtedly reached its peak in the 1960’s and the 1970’s, with the economic growth and the prosperity of industry, services and trade in the large cities and in particular in Beirut. The war period had then a contradictive effect. On one hand, many displaced from the villages in the South and Mount Lebanon sought refuge in Beirut’s suburbs along the North (Matn and Kesrouane) and South (Baabda and Aaley) and, on the other hand, the battles in the capital favored some economic development in the peripheral regions.

The end results of that the period 1970 to 1997 showed a larger concentration of the population in the cities, as indicated in the following table.

**Table 19: Resident population per size of agglomeration in 1970 and in 1997**

<table>
<thead>
<tr>
<th>Size of Agglomerations</th>
<th>1970</th>
<th>1997</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 1 000 inhabitants</td>
<td>391 440</td>
<td>18.41%</td>
</tr>
<tr>
<td>1 000 to 2 000</td>
<td>246 945</td>
<td>11.61%</td>
</tr>
<tr>
<td>2 000 to 5 000</td>
<td>187 260</td>
<td>8.81%</td>
</tr>
<tr>
<td>5 000 to 10 000</td>
<td>68 415</td>
<td>3.22%</td>
</tr>
<tr>
<td>10 000 to 100 000</td>
<td>136 005</td>
<td>6.40%</td>
</tr>
<tr>
<td>More than 100 000</td>
<td>1 096 260</td>
<td>51.56%</td>
</tr>
<tr>
<td><strong>Total Lebanon</strong></td>
<td><strong>2 126 325</strong></td>
<td><strong>100.00%</strong></td>
</tr>
</tbody>
</table>

Source: CAS, 1970 and 1997

In 1970, more than 30% of the population was still living (permanent residence – all year long) in localities with less than 2000 inhabitants. This proportion has fallen to less than 14% in 1997.

In 1970, 58% of the population was already living in localities of more than 10 000 inhabitants. This proportion has risen to more than 64% in 1997 (of which more than 62% in agglomerations of more than 40 000 inhabitants).

The rural area is now at the second phase of its history: rural exodus – in the classical meaning of the word – is now complete, and the ways of life of cities and countryside have become quite similar. However, the rural area has not yet found a replacement solution allowing it to ensure a sustainable economic and social development. Lebanese villages now live with modest resources that generally come from:

- Public servants, salaries (local public servants, teachers, employments in the army);
- “Mandatory missions” of people originally from the village but not residing in it: supervision of plowing and harvest, surveillance of construction sites, etc.
- Financial transfers from relatives living in the city or abroad;
- Retirement pensions;
- Regular sale of inherited real estate properties; and
- Accessorily: agricultural incomes\(^5\).

Some people in each village gain their income from specific service activities: the grocer, the taxi driver, etc. A small number of Lebanese villages benefit from more important activities: industries, hotels and others.

For the future, means should be devised to maintain the social structure of the Lebanese villages and to do so, sufficient income level should be ensured.

Lebanon isn’t the only country to have known the rural exodus and the drop of income in rural areas. In many other countries, this evolution has occurred well before the second half of the 20\(^\text{th}\) century, and new evolutions have since then taken place in which rural areas have found a new dynamism.

This new dynamism has been achieved through the passage to a new development phase, based upon the diversification of income sources. The most successful experiences are those where the villages have succeeded in:

- Attracting new residents who work in the city but would rather live in the nearby countryside, due to its proximity to major cities and to the quality of its living standard;
- Attracting retired persons who would rather live in the countryside than the city, due to its living standard quality;
- Attracting summer vacationers;
- Attracting tourists;
- Creating original activities totally related to the identity of the villages: artisanal or industrial productions from natural products of the region, labels of quality, etc.

Role of relay-cities in development of local and rural economy

The development of rural area cannot be considered independently from that of cities: it should benefit from the dynamism of cities while putting forward its own specific advantages.

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\(^5\) While the rural world resident population represents a third of the population, agricultural income barely represent 6\% of the country’s gross income. Even more, the agricultural income only benefits a minor fraction of the permanent inhabitants of the rural world, since the major exploitations, which are well equipped and most profitable, are generally owned by persons residing in the big cities.
The diffusion of the process development will be conceived through the articulation, as per the hierarchy between the large agglomerations, a series of small cities or important villages (relay-cities) and other localities of the rural areas.

It is important for rural areas not to be entirely dependent, for employment, trade and services, on large agglomerations; but we should rather identify within each Mohafaza some ten important localities that can ensure an efficient relay for these functions.

This same concern had prevailed in the 1960’s when the State had applied by decree the policy of “development centers” that were to host primarily administrative, health and education facilities.

The relay-cities as identified by the National Physical Master Plan should have priority in the policies of economic development in rural environment. Administrative and security functions, public services (including education and health) and trade functions should be developed at a coherent level as per the needs of the regions.

Diffusing tourism development in all the country, particularly in the rural regions

Facing the challenge of globalization will necessarily lead to in depth restructuring of the entire sectors of the national economy, with the threat of job losses accompanying productivity in gains. One of the most appropriate measures to respond to this threat is, undoubtedly, to develop tourism activities and income.

All Lebanese regions have, and that is a unique chance, a potential based on tourism, which should be put into value and exploited.

Obstacles that make, internal tourism particularly shy and western tourism almost inexistent, should be overcome. In fact, only Arab tourism (Gulf countries) and summer vacation of a part of the diaspora have developed.

The obstacles related to the development of local tourism are numerous: some form of a withdrawal inherited from the war, “territorial marks” closed on each other, insufficient information about boarding offers, water and electricity problems, waste problems and degradation of landscapes, etc. However, all these obstacles may be overcome and their disappearance will contribute in the emergence of hosting services corresponding to the demand, which would hence be freed.

As for the obstacles related to the development of occidental tourism, they are linked to two major factors: the image of insecurity of all countries in the Near East and the high level of costs (lodging, restaurants, transport, …) of Lebanon in comparison to similar destinations. It is vital to tackle these problems of image and costs.

The development of tourism in all of the Lebanese regions, particularly in the rural areas, is particularly important in order to diversify the villages' and the small cities' resources and to increase the income of their inhabitants.
Succeeding in restructuring the Lebanese agriculture

The economic development of the peripheral regions depends upon successfully restructuring the Lebanese agriculture under the effects of international competition.

Contrary to a preconceived idea, Lebanon has an important agricultural potential, based on the quality of its soil, which is among the most fertile of the Middle East, on the availability of water, on the know-how of farmers and on Lebanon’s commercial traditions.

At all times, Lebanese agriculture adapts to external constraints where a number of products managed to efficiently face competition. This is especially the case of industrial crops and “fine” products of high added value. Also, the sectors of citrus, fruits and market products face up to competition quite well.

Agricultural investments will naturally turn to more competitive products and will succeed through adequate support of government policies.

These policies will no longer be customs protection policies or quotas (agricultural calendar). They should be tackling more and more the general environment of agricultural activities:

- Credit to investors;
- Organization of marketing networks;
- Cost reduction of agricultural inputs;
- Organization of commercialization circuits and commercial surveillance;
- Preservation of high productive agricultural lands;
- Land consolidation;
- Mechanization and introduction of new varieties and techniques;
- Agricultural research and improvement technologic;
- Irrigation; and
- Guidance programs and technical assistance to farmers.

The National Physical Master Plan identified clearly the best agricultural lands that should be preserved as a priority for agriculture, while limiting the dilapidation of this national capital through less productive uses, such as housing estates. It equally brings coherence between the irrigation projects planned by the State and the lands that should benefit from these projects.

Developing means of communication

The regional development in the era of globalization requires a modern and largely diffused means of communication and information.
Lebanon should catch up on a major delay in this matter. The capital itself is still not equipped with adapted services, either for the digital communication through the internet or for televisual communication via cable or satellite.

The situation of the peripheral regions has visibly a lower standard. Many cities and villages do not possess the least of office equipment, photocopier, fax or computer, whether connected or not to the internet.

The diffusion of networks and tools of modern communication is no more a luxury. In today’s world, it has become an indispensable mean for commercial promotion of local products, tourism promotion, communication between clients and suppliers, research and education, publishing, sharing information…

Lebanon should improve its technological means and the rapidity of access and diffusion of information. Progress has been made, but the essential remains to be achieved.
Figure IV.2: Economic Development Principles

The national economic development of the country is based on the complementarity and solidarity of all parties of the territories, linked to each others and developed in function of their corresponding vocations.
IV.3 UNIFYING THE TERRITORY THROUGH AN EFFICIENT TRANSPORTATION NETWORK

Transportation plays a determining role in land management of the territory from two points of view: they are essential for the national as well as social economic development and they constitute a major factor of unification of the territory by shortening the distances between cities and regions.

The transportation network adopted by the National Physical Master Plan has been conceived to meet the above two objectives, taking into consideration the limited resources of the State and the Municipalities. The private sector could undoubtedly construct certain infrastructure and assure a number of profitable services, but the main efforts in this sector remain the responsibility of the competent public authorities. This demands going through a strict project selection procedure.

The Choices of primary importance in transportation

For many reasons, the choices in the transportation sector are of primordial importance in land management. First of all, the infrastructures have a very high cost: The Beirut-Damascus highway is estimated at US$ 1 billion; the complete rehabilitation of the existing inter-urban roads is estimated at US$ 1.2 billion; the project for the creation of a new deep seaport in the South would cost US$ 400 million; the cost of the reconstruction of the Beirut Airport has been roughly US$ 1 billion; and the reconstruction of the skeletal structure of Lebanon’s railways (Tripoli to Tyre and Beirut-Damascus lines) could cost US$ 2 billion, and more if a complete network is requested (coastal line, to the borders, Rayak line to the Syrian border in the North, etc.).

Moreover, the choices of the transportation sector involve the future for a very long term, for decades and even centuries. And even when transportation technologies change, original infrastructure lines are often reutilized. The duration of feasibility studies, decision process, necessary financing arrangements and duration of construction are also expressed with decades rather than years.

The third major characteristic of the transportation infrastructures is the fact that they play an important role in orienting the land use. Highway and railway lines have always attracted investors, oriented economic development, and guided migration flows. At a medium scale, the construction of inlet exchanges or railway stations guided the establishment of enterprises and urban expansion. At the local scale, the organization of road network, as well as the creation of bus stops for the public transport, constitutes a necessary and often sufficient condition for economic development and for construction.
IV.3.1 The main orientations of the transportation sector

The orientations adopted by the National Physical Master Plan in the transportation sector can be summarized as follows:

Five complementary and distinct aspects

The conception of the national transport network is based on the distinction between 5 different aspects:

1. The means of transport for export, import and international transit: This aspect requires solutions adapted to the volume of goods and to the locations of exchange modes and places of destination.

2. The inter-urban links: Efficient links must be assured between various town and agglomerations of the country.

3. The specific situation of the Central Urban Area (Beirut + Mount Lebanon): With 2 million people, a port and an airport, a large concentration of tertiary services and industrial activities, plus an integrated plan for urban transport and transit is required. The main problem to deal with in this zone is the congestion of traffic.

4. The level of service of the Lebanese road network as an entity that leads to the problem of rehabilitation and maintenance.

5. The new local roads reserved for the expansion of cities and villages: Should we wish to limit the linear extensions cities and villages along the inter-urban roads, the offer for local roads is essential in order to orient urbanization around the established localities.

The measures considered by the National Physical Master Plan are detailed in accordance with the above-mentioned 5 aspects.

IV.3.2 Offering international services (import, export, transit, airport services) of high quality

The economic development of Lebanon passes through the conservation and the development of high-level logistic services at national and international scales. This concerns especially ports, international roads and airports.

Airport services for passengers

There are nine airport runways in the country. But only the Beirut International Airport (BIA) is in operation for civil services.

Created in 1954, the BIA had rapidly become the first in the region and succeeded in keeping this rank until the outbreak of the Lebanese war in 1975. Between 1954 and
1975, Beirut used to play a role of a hub for the Near and Middle East traffic, in addition to the traffic from and to Lebanon. In 1974, the BIA had recorded 2.75 million passengers, equal at that time to, the traffic in Atatürk airport in Istanbul (13.5 million passengers in 1999) or Oslo airport (14 million today), and overtaking Bangkok airport (25.6 million 1998). During the Lebanese war, the traffic of BIA decreased significantly, to a minimum of 0.5 million passengers in 1984 and 0.2 millions in 1989.

The traffic is in constant increase since the end of the war in 1990 (more than 5% per year during the last five years). In 2001, it has been slightly below the 1974 level (2.45 million passengers in 2001 against 2.75 million in 1974) and should regain 1974 level in 2003 or 2004.

Around 40 airlines serve the BIA. The transit however accounts only for 3% of the total passenger flow, while its share was 20% prior to the war.

The Beirut International Airport faces currently a tough competition in the region, with many Near East capitals having developed their airport infrastructures during the Lebanese war. Dubai has become the hub of the Gulf and Middle East. This airport is served by 100 airlines and is linked to 102 destinations. It has exceeded the 15 million passengers per year and nowadays deals with more than 0.7 million tons of goods. Damascus, a relatively modest airport, recorded 3.2 million passengers in 2000, and that of Aleppo 1.7 million. The airport of Larnaca in Cyprus (a country of less than 1 million people) counted 2.4 million passengers in 2000 and that of Amman 1.3 million.

After the war, in 1993, a Master Plan for the development of the BIA was prepared, projecting the expansion of its facilities in 4 phases at 6, 9, 12 and 16 million passengers per year, respectively.

The executed work since 1994 has resulted in an entirely modernized airport. A new marine runway has been constructed on the west side and the east runway has been rehabilitated, providing an overall capacity of 16 million passengers per year. The new terminal that has replaced the old one, has a capacity of 6 million passengers per year. Related facilities have been introduced, restored and/or extended.

The area between the new marine runway and the old west runway has been set for the possible creation of a free zone over 31 hectares with 150,000 m$^2$ of exploited area. The implementation of this project has been postponed.

In theory, the new terminal should be sufficient for the next 10 to 15 years and the runways for 30 to 40 years. The growth of the passengers’ traffic will first rely on the tourist attractiveness of the country, in a large part on the local prices and on the regional crises and airlines fair tickets. If Lebanon looks forward to become again an important regional hub, many factors must be taken into account and this could take 2 to 3 decades.

As for the other runways of the country, the Government has considered the rehabilitation and operation of two of them, Qleyaat and Rayak.
The Qleyaat airport project, named the Airport of Rene Mouawad, in the North, consists of a runway capable of receiving 1 million passengers and 200 000 tons of freight per year. A free zone is planned over 45 hectares.

The Rayak airport project will have the same capacities, namely 1 million passengers and 200 000 tons of freight annually. Its free zone is planned over 36 hectares.

No specific schedule has been set for the above projects, and their feasibility (for both passengers traffic and freight issues) is not obvious.

The National Physical Master Plan recommends, in this matter, a conservative and rational approach: the traffic in BIA should reach a satisfactory level of 7 to 8 million passengers per year (triple of today’s figure) before going into other civil airport projects in the country.

**The airfreight**

The airfreight is unlikely to play a major role (in volume not necessarily in value) before 2030 in the transport of merchandises. The BIA has a current annual traffic roughly above 60 000 tons, which is less than the traffic at the beginning of the civil war (100 000 tons). This represents 1/10 of the Dubai traffic. The free zones and freight airports projects of Qleyaat and Rayak, besides that their execution remains uncertain, have limited chance of increasing the demand for transport.

It is thus more judicious, to exploit completely the capacities of BIA, considering the amounts already invested in the airport (modernization of the east runway and construction of the marine west runway) and which are currently under-exploited.

**The situation of the freight in the Middle East**

Before the civil war, Lebanon has played a major role in the transportation of goods to the Middle East, benefiting from the advantages that were capitalized in capacity, know-how and quality of service. The transit corresponded to almost 40% of the Port of Beirut operations, and the export of goods by land and sea was almost half of imports.

Since then, the situation has significantly changed, especially with the improvements brought to transportation infrastructures and services (maritime, terrestrial and aerial) in Jordan, Syria and the Gulf States.

The growing shares of imports of goods of Asian origin to the region and the exponential increase of the Gulf States markets was translated by the use of the maritime lines towards the ports of the Gulf (mostly Dubai). In these circumstances, Lebanon receives often the goods conveyed to it specifically by land and which come through the Gulf platforms.

Iraq, the main client for the goods transiting through the Mediterranean ports, has been placed under embargo nearly since the end of the Lebanese war. The small
remaining traffic with Iraq has been divided within the framework of the Lebanese-Syrian agreement, granting the Lebanese ports 1/4 of the whole volume. The end of the embargo in 2003 allowed the resumption of exchanges with Iraq, but the new geopolitical situation put the Lebanese and Syrian ports in a very tough competition with other ports in the region.

At the land transport level, an overall look at the Near East map shows that goods transited between Europe and the large markets of the region have no interest in crossing Lebanon; It is more effective to make use of the interior axes, especially the North-South axis that crosses Damascus and Amman, and branches out towards the East (Iraq and Gulf), the West (Lebanon, Palestine, Israel and Egypt) and South (Saudi Arabia and Yemen), as well as the axis along the Turkish-Syrian border that heads towards Baghdad and then to other Gulf States.

The coastal axis, congested by urbanization, would not compete with these two main itineraries of international transit road network. It would rather have the vocation to assure access to final destinations.

Volume of imported, exported and transited goods in Lebanon

It is important to distinguish imported and exported goods on one hand, and transited goods on the other.

Lebanon produces few goods. The agriculture, water, energy and industrial sectors, in other words primary and secondary sectors, represented barely more than 21% of the Lebanese GDP at the end of the 1990’s and it is difficult to expect a significant increase for the coming ten years. Hence, Lebanon imports much more goods than it exports. The imports/exports ratio has changed with time, but it has extremely degraded at the end of the civil war and its improvement is very slow. Currently, it is about 10 to 1, while it did not exceed 2.5 to 1 before the civil war.

At the end, this situation is not viable and it is likely – and hopefully – that Lebanon recovers rigorously its balance of trade to come closer to the pre-war ratio.

Currently, imports and exports of Lebanon represent (without the transit – insignificant today) around 6 to 7 million tons per year that cross essentially the port of Beirut. With the expected growth of GDP from 60% to 100% in 30 years, this traffic will at least double. The experience shows however that the volume of transported goods increases in general faster than the GDP. Hence, the National Physical Master Plan adopted a volume of 20 million tons of imported/exported goods in 2030.

As for the transit, the expectations are far less certain. It is important to remember that the transit constituted, in the mid-1970’s, 40% of the volume of goods handled in the port of Beirut. It is unlikely to regain this percentage, because of the competition of the ports in other countries of the region and the increase of international land transport. Hence, an optimistic – but nevertheless reasonable – forecast would predict a ratio of 20% of overall transit in the whole country (of transit compared to the total
volume). The transited goods would reach, according to this hypothesis, 5 million tons, at its best, in 2030.

Taking into consideration the available capacities and those under development in the ports of Beirut and Tripoli, as well as in Beirut Airport, the volume of transit forecasted for Lebanon does not require any additional development in above ports until 2030. The need to increase the capacities of these infrastructures could only come from a massive and sustainable revival of transit, which seems unlikely today.

The ports of Lebanon

Maritime transport is the most economic (roughly 100 times less expensive than land transport per tons x km) and it should therefore constitute a priority. Its costs have nevertheless significantly increased by the introduction of terminal transportations, carried out in Lebanon exclusively by land. The idea of Lebanon having several large ports becomes interesting and realistic, in order to reduce the costs of the terminal transportation.

Furthermore, it is appropriate to consider that the Lebanese ports would be handling the main traffic of import, export and transit. Their cumulated capacity should allow a handling capacity of more than 20 million tons of goods in 2030.

The port of Beirut, the traffic of which varies considerably according to the economic situation, has a significant large capacity and is currently under-exploited (around 5 million tons of traffic). It has been recently rehabilitated and modernized (there are still ongoing works for US$ 150 million). It possesses 10.4 hectares of free zone.

The port of Tripoli, which will be rehabilitated soon (for a relatively low cost: US$ 50 million), should constitute a priority for handling the transit traffic from Iraq. This vocation is justified by the fact that land access from Tripoli towards other Arab countries is the easiest, due to the Homs passage, and that a railway is also expected between Tripoli and the Syrian and regional railway network. The current traffic of Tripoli port (0.7 million tons) could considerably increase, and this would contribute to the revival of the economy of the North.

The ports of South Lebanon could have opportunities for development due to the fact that they potentially control the roads towards Palestine and Jordan. Nevertheless, even in case of the Near East conflict resolution, the potential of these ports will be affected by the high competition of Haifa and Aqaba. Furthermore, the location of the ports for high tonnage vessels causes serious difficulties in Saïda as well as in Tyre. It will be more appropriate, in principle, to consider with caution the possibilities of increasing the ports capacities in the South. However, in case this increase is to occur, it will be appropriate to consider a new port mid-way between the two cities of Saida and Tyre, using the Nabatiyeh highway towards Qonaitra.

The port infrastructure facilities seem to have been extensively initiated in Beirut or being done in Tripoli. The main effort should be carried on **the quality of the offered services** in those ports, which implies:
- Simplification and speed of formalities (the time spent in ports constitutes a major part of the maritime transport cost);

- An improvement in the services offered to the vessels as well as to the carrier, especially relying on maximum automation;

- The development of containers service (which presumes equally an adaptation of trucks and eventually wagons if the railway is reconstructed) and “ro-ro” service (roll on - roll off); and

- Carrying out clearance tasks by a single agent for the whole chain from its starting point to destination.

The adoption of the above procedures would then allow the ports of Lebanon to compete with the neighboring ports of the region.

**Land transportation of goods**

Half of the Lebanese exports is currently carried out by land transportation, while import and transit traffic by land occupy a less important role. The international road traffic concerns first of all the Near and Middle East countries. Its development encounters, besides the weaknesses of the road network, the slow process of formalities at the borders and elsewhere. Its cost is very high, exceeding 18% (and up to 45%) of the transported goods value, while this ratio remains below 5% in the developed countries.

This high cost, the noise and the pollution generated by land transportation of goods as well as the deterioration of the road network (a truck causes damages to the pavement much more than a regular car), do not encourage this type of transportation. However, this latter is unavoidable in Lebanon for attracting the transit traffic towards Lebanese ports, an essential need for the economic development.

On the other hand, it is advisable to reduce to the maximum the transit of trucks, for which Lebanon is neither the origin nor the destination. This traffic presents all the above-mentioned inconveniences and does not bring any positive economic benefits.

Also, the responses that the road could provide to the needs of international transportation of goods consist, above all, in properly linking the Lebanese ports to the centers of consumption and production of the country (especially the large agglomerations), and option ally to regional road and railway networks.

**Transportation of goods by railway**

The development of a railway network could not be justified only for cargo transportation, except for specific point-to-point links, because of the competition of land transportation, which is purely more efficient and flexible.
However, Lebanon has interest to put back into service a minimum of a railway network to assure specific cargo transportation. Despite the high cost of renovation of the railway network, the National Physical Master Plan considered this perspective, in particular for the connection between Tripoli and the Syrian railway network. In fact, this connection could reinforce the transit role expected for the Tripoli port and could be extended along the coast towards Beirut, and even beyond in order to serve passenger traffic (see section on mass transportation) and not that of goods.

The logistic centres for freight

The main logistic centres of the country are located within the ports and the airport premises. They allow to unload the commodities from the vessels into trucks and vice-versa, and to store them while waiting for their clearance.

Nevertheless, more modest centres are required, intended for loading/unloading of industrial and agricultural products in storage zones. The National Physical Master Plan proposed, to that effect, the creation of a logistic centre connected to the three major industrial zones planned in Tripoli-Beddaoui, Zahle and Zahrani, that could equally serve as storage and unloading zones for the agricultural products of Akkar, Beqaa and the South.
Figure IV.4. Principles of transportation of goods
IV.3.3 Secure strong connections between cities

Economic efficiency and reinforcement of unity of territory require a network of inter-urban connections capable of assuring the best means of movement possible in adequate conditions of security and respecting the environmental concerns.

The National Physical Master Plan has set up the objective that in 2030, no important locality (relay city) would be more than 100 minutes away from Beirut, no secondary agglomeration would be more than 60 minutes away from Beirut, and no relay city would be more than 30 minutes away from a major agglomeration.

Taking into consideration these objectives, as well as the financial constraints, the considered road plan for 2030 is presented as follows:

1. **A highway connection between Beirut and Tripoli, extended to the northern border and tangent to Halba**: this highway should be absolutely protected from any construction along its sides. In this case Tripoli would be at 60 minutes or less from Beirut. The access to Halba has the objective of reducing the time-distance between Tripoli and Akkar as well as Tripoli and Hermel. The highway must be placed at the foothill between the plain and the hills of Akkar, and not in the middle of the plain. It might be extended afterwards towards Aabboudiyeh to be connected to the Syrian and regional highway network.

2. **A highway connection between Beirut and the agglomeration of Zahle-Chtaura-Qab Elias, extended to the eastern border**. This “Arab highway” is a priority, given the fact that it resolves the capacity problems of the Aaley and Dahr el-Baydar road, and connects the capital to the city of Zahle in less than 40 minutes, and the Lebanese highway network to the Syrian and regional network.

3. **A highway connection between Beirut and Tyre**: it is already constructed until the city of Saksakiyeh and is being extended to Tyre. Due to this highway, it will be possible to connect Beirut to Tyre in less than 60 minutes.

4. **A highway connection between Zahrani and Marjayoun**: this link is currently assured by a high-speed road to Nabatiyeh, the borders of which should be managed in order to secure total fluidity of traffic. Its extension should be planned beyond Nabatiyeh towards Marjayoun, and subsequently towards Qoneitra and the regional highway network. In fact, this connection should assure not only rapid access to Nabatiyeh, but also traffic of goods from and towards the ports of the South and the industrial zone of Zahrani.
5. **High speed connections (in general 2 x 2 roads) to complete the main network.** This type of link is proposed for:

- The connection Zahle-Hermel passing through Baalbeck: This should connect Zahle to Hermel in 60 minutes and Zahle to Baalbeck in 35 minutes. It would take the existing road until Rayak, then, instead of continuing along the current itinerary in the middle of the agricultural plain, it would continue until Saraaine el-Tahta. From there, a completely new high-speed road will assure connection with the entrance of Baalbeck and its ring road, then it will continue straight, once more in a new road, until Rasm el-Hadath (avoiding the plain), and finally along the existing road until the bifurcation towards Hermel.

- The connection Marjaayoun – Majdal Aanjar – Baalbeck from the east side of the plain of the Beqaa: This road will follow the existing roads, widened and managed as a high-speed road. It will allow linking Nabatiyeh to Masnaa in 50 minutes and to Chtaura in 60 minutes, and it will also assure faster connections with Baalbeck, Majdal Aanjar, Kamed el-Laouz, Joub Jannine, Rashaya and Hasbaya.

- The Halba – Qobaiyat connection, to be managed as a high-speed road, will facilitate the access from Tripoli towards the north of Akkar, Wadi Khaled and Hermel. With the execution of the Tripoli – Halba highway and the transformation of the Halba – Qobaiyat road into a high-speed road, the time-distance between Tripoli and Hermel should be reduced to around 60 minutes.

- South connections from Shehabyeh. The improvement of the roads between Tyre and Marjaayoun, as well as between Bent Jbayl and Nabatiyeh is a matter of substantial importance. It should be possible to link Nabatiyeh to Bent Jbayl, or Tyre to Marjaayoun in 30 minutes.

6. **Strong Non-highway connections towards certain localities of the Central Urban Area and of the agglomeration of Tripoli:** These connections concern on one hand, the itinerary Tripoli – Ehden – Tourza – Amioun – Chekka, and on the other hand, the links between the coastal highway and Aajaltoun, Bikfaya, Broumana and Aaley (from Damour). They are intended to reduce congestion and help provide rapid access to the towns located at higher altitudes.

7. **Priority improvements of connections to relay-cities:** it concerns the completion of the main network by selecting itineraries allowing a total coverage of the territory and distance reduction between localities. The majority of these links exists already. Therefore, priority rehabilitation works are required. Nevertheless, several new connections must be constructed, namely from Sir Dinniyeh towards Akkar and Ehden. The connections of the relay-cities are represented on the general organization map of the territory.
8. **Connections between relay-cities and surrounding localities**: these connections must be rehabilitated and maintained on a regular basis.

9. **Inter-urban railway connections** could be considered towards the end of the 2000 – 2030 period, especially on the Beirut – Tripoli axis. The passenger traffic intensity does not justify the re-instatement of this railway section in the short and medium terms; its concept should however be maintained as its feasibility may be justified in the future. In general, the National Physical Master Plan recommends the preservation of the railway right of way, which is likely be of great benefit in the future, when circumstances permit.

### IV.3.4 Establish an integrated transport system for the entire Central Urban Area

In Lebanon, it is only the Central Urban Area (Greater Beirut and adjacent agglomerations) that is at a scale that imposes the selection of strategic choices for urban transportation. The difficulties rise therein in terms of capacity, and not in terms of availability or connections.

**An important growth in motorized trips**

The number of motorized trips of the residents of the Central Urban Area will roughly double between 2000 and 2030, from 1.3 million trips per day up to 2.5 million. Displacements within this perimeter carried out by non-residents should be added; they are estimated, at more than 400 000 additional trips in 2030. **In total, the Central Urban Area will record most likely 2.9 to 3 million motorized trips per day in 2030, against 1.6 million in 2002.**

**Table 20: Population growth and motorized trip forecasts in the CUA**

<table>
<thead>
<tr>
<th></th>
<th>Resident population 2000</th>
<th>Resident population 2030</th>
<th>Number of motorized trips per day and per person 2000</th>
<th>Number of motorized trips per day and per person 2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beirut</td>
<td>400,000</td>
<td>430,000</td>
<td>0.68</td>
<td>1.06</td>
</tr>
<tr>
<td>First ring</td>
<td>900,000</td>
<td>1,000,000</td>
<td>0.87</td>
<td>1.37</td>
</tr>
<tr>
<td>Second ring</td>
<td>300,000</td>
<td>500,000</td>
<td>0.90</td>
<td>1.40</td>
</tr>
<tr>
<td>TOTAL</td>
<td>1,600,000</td>
<td>1,930,000</td>
<td>0.83</td>
<td>1.30</td>
</tr>
</tbody>
</table>

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6 The values of individual mobility had been measured in the Metropolitan Region of Beirut (RMB) in 1994 (CDR, Transportation Plan for Greater Beirut) in a Beirut / Suburbs division. The individual motorized displacement growth hypothesis considered in the framework of the current study is 1.5% per year.

7 In 2002, recorded traffic at the entrances to the CUA counted roughly 360 000 passenger trips per day (NPMPLT Transportation survey). The part induced from residents out of CUA in this traffic is evaluated at 75%, or 270 000 passenger trips. With a progression ratio of 1.5% per year, this number will increase to 410 000 in 2030.
From the transportation planning point of view, it is most important to determine, amongst these trips, those following radial paths and susceptible to increase traffic saturation at the Beirut entrances. It is thus, important to evaluate daily flows and deduce the required capacity at peak hours.

The Transportation Plan for Greater Beirut\(^8\) constitutes, to date, the most recent and accurate document concerning transport over different types of paths. By projecting this “ventilation” in 2030 (3 million daily trips), it is possible to obtain:

- 1.6 million motorized daily trips within the Greater Beirut (Beirut and its first ring), against roughly 1.1 million today;
- 0.8 million motorized daily trips between the second ring and the Beirut Metropolitan Region (Beirut and the first ring), on radial lines, against 0.5 million today;
- 0.6 million motorized daily trips within the second ring, bypassing Greater Beirut (tangential lines in the second ring), against 0.4 today;
- 0.05 million motorized daily trips in transit in the Central Urban Area (that cross the zone without a stop), against 0.03 today.

The number of central trips (1.6 million) and radial trips (1 million) would be thus 2.4 million, which means about 50% growth in comparison with 2000.

However, this growth will not be homogeneous along all the radial paths. In fact, the main demographic and urban growth will occur in the north and the south of the urban area, between Maameltein and Nahr Ibrahim in the North and between Khaldeh and Damour in the South. Elsewhere, only the individual mobility growth will increase the demand.

Hence, it is logical to think that the traffic growth will be significantly higher along the northern, southern and southeastern radial axes (it would be reasonable to predict an increase of demands by a factor of two) than along intermediate radial axes, such as Bikfaya or Broummana (that could be effected by a 25% or 30% growth).

Settle the critical situation of the large axes at the entrances of Greater Beirut

Taking into consideration the existing situation for infrastructure, the perspectives reveal a critical situation along the northern coastal axis and along the Beirut – Damascus axis, while the South highway seems to stay unsaturated until 2030.

**Southern highway:** The Southern highway assures today, until Khaldeh, the crossing of 25 000 to 30 000 vehicles per day and in all directions, and about 2,500 vehicles per direction at peak hour. It functions at 40% of its capacity at peak hours and thus possesses, theoretically, enough margins in case of a double-sized flow, provided that its highway characteristics remain preserved. If this highway is “encroached” by

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\(^8\) Transportation Plan for Greater Beirut, 1995, CDR, Team international – IAURIF - SOFRETU
ribbon constructions and commercial activities, its efficiency will decrease and will not be able to satisfy the demand.

**Beirut – Damascus axis:** The situation is already critical on this axis. Until Jamhour, the records of the traffic volume show that the axis is saturated, necessitating already a double capacity (2 x 4 instead of 2 x 2 roads). This situation will certainly worsen with the reconstruction of Aaley and its region, and the increase of mobility. For the horizon 2030, it is necessary to project a four times increase of the existing capacity, which can not be realized without the execution of the missing section of the Arabic highway, that is at least a connection between “the airport axis” and Laylake until Bhamdoun for a start.

**North axis:** The northern axis, which functions currently at its maximum capacity, will face the hardest problems for the coming decades. It assures today crossing (at Dbayeh) for 80 000 vehicles per day and per direction, and about 6 000 vehicles per direction at peak hours, with an occupancy rate of 2.1 persons per vehicle. The perspective of a double-sized traffic volume in 2030 would require the construction of 5 additional highway lanes in each direction. At the crossing between Zouk and Jounieh, it would be necessary to pass from 2 lanes per direction to at least 5 or 6 lanes, which corresponds to another 2 x 3 or even 2 x 4 highway.

Such perspectives must lead to a more global and prospective analysis of the problem. In fact, in case these additional lanes are executed, what will happen later on if growth continues? Will it be possible then to construct more highways in an area facing topographic constraints? Apparently, it is important here to initiate collective public transportation.

The National Physical Master Plan recommends, on these bases, to conceive a double response to the problem of the coastal axis: **one related to private motorized vehicles and the other to public transport.**

**A double response: road and public transport**

This response must be carried out in 3 phases:

**Phase 1:** It is appropriate, at a first stage, to increase the transport capacities along the northern axis, between Qarantina and Dbayeh. The new road offer must provide the opportunity to an integral recuperation of the ancient railway lines to use it for public transport in a reserved corridor. At the road level, a 2 x 2 road would be created along the coast between Qarantina and Antelias. At the public transport level, buses (with a capacity of more than 50 passengers) would be set up only to take the path of the coastal railroad, after rehabilitating it for this purpose only. These buses would start from the foothills (Antelias, Jal ed-Dib, Zalka, Fanar, etc. axis), where they will collect the passengers; then they would join the coastal road, where bus stops would be certainly less (2 or 3 between Dbayeh and Beirut); and finally, they would enter Beirut, preferably along reserved corridors for their paths only.

**Phase 2:** As a second stage, the widening of the road between Nahr el-Kalb and Maameltein would have started, following a course to be defined in the framework of
complementary analyses, taking into consideration the important insertion constraints. This new path should be connected to the existing path at Dbayeh on one hand, and Maameltein on another (where the two infrastructures would be established): the new road would be designed to be used for transit only. In parallel, the main public bus network would be extended, according to Phase 1 principle, to the north-south itineraries (Jeita, Shnaniir, etc.) and to the eastern and southern suburbs (Hazmiyeh, Aaramoun, Damour, etc.). At the same time, bus corridors would be developed in the southern suburb (Borj Barajneh / Ghobeiry / Beirut) and the eastern suburbs (Sin el-Fil, Dekouaneh, etc.) and within Beirut.

**Phase 3:** The roads network would be improved again by the creation of two sections of the ring road (A2): on one hand, between Nahr al-Mott and Nahr al-Kalb, and on the other, Hazmiyeh and Khaldeh. With the operation of these road sections, a restructured collective transport offer would replace the displacement of the bus itinerary from the railway corridor towards a corridor along the “old Tripoli road” in the north and the “old Saida road” in the south, as well as the rehabilitation of the railway for an inter-urban service, between Tripoli and Beirut, and between Zahrani and Beirut.

After 2030, other developments will be considered, especially the completion of the ring road between Hazmiyeh and Nahr al-Mott (this section is postponed till after 2030, due to services provided by the Hazmiyeh – Qarantina highway), and the establishment of an urban transport, heavier than buses (a “light” metro or a modern tramway) for the connections between Beirut and the near suburbs.

Establish a single authority to manage the transport sector in the Central Urban Area

The reflections initiated by the Ministry of Transportation have, for many decades, recommended the establishment of a unique authority organizing the transportation in Greater Beirut.

The National Physical Master Plan recommends the establishment of this extremely important authority, at the scale of the entire Central Urban Area, starting from Jbayl in the North to Damour in the South, and from Beirut until Aaley in the East.

This authority should have jurisdiction to take every decision that concerns the transportation sector in this area, whether it is public road investments and collective transport, or regulation of transporters’ activities, circulation maps on the main network, and even traffic signals.

This authority must be endowed with financial abilities corresponding to the level of its task. The Funds that it must manage could be supplied from various sources, to be defined later, eventually part of which would be from the Ministry’s budget, municipal contributions, and even from specific tax revenues (fines, parking, even oil products).
IV.3.5 Improving the quality of the road network across the territory

The general situation of the Lebanese road network is rather unsatisfactory, and more efforts are needed in order to improve its quality.

This requires important and more consistent investments in the rehabilitation and maintenance of the network.

The service level of the roads sector is essential for the fact that it unites the territory and reduces the distances between towns and agglomerations. The existing network assures services for the largest number of inhabitants and activities. Its situation is vital for public safety and the financial savings in the cost of cars and spare parts.

An optimal method for the distribution of credits for road extensions, rehabilitations and maintenance has been defined in the framework of a recent study (Road User Charges) financed by the State. The National Physical Master Plan recommends using this study for future planning.

The rehabilitation and the maintenance of the Lebanese road network require the investment of roughly US$ 1 billion until 2030.

IV.3.6 Releaving inter-urban roads from local functions

The inter-urban road network suffers from dense linear constructions, causing a slowdown of traffic and deteriorating public safety. Thus, it is important to find the adequate means to reduce this “intrusion” along inter-urban roads whose functions are not limited to urban / local activities.

One of the main reasons that lead people to build along these roads, and expressways, is the shortage of lands for construction appropriately served by roads and infrastructures at the immediate surroundings of cities and villages. This is why linear extensions are often noticed between villages that end up joining with each other.

Hence, the National Physical Master Plan recommends the establishment of a national plan for the development of municipal roads within the nearest perimeter of the extension of existing urbanizations, and avoiding inter-urban roads.

Such an ambition could not be achieved by municipalities alone. It should be strengthened by a national approach.

The efficacy of the national road network could not be guaranteed without such an action, along with a more severe restriction on habitat and trade along these infrastructures, especially along expressways.
Figure IV.5: Principle for Defining Road Network

- Road network supporting development:
  - Highway
  - Main road
  - Link road
  - Seaford promenade

- Regional and localized public transport:
  - Main itinerary
  - Railway
  - Reconstituted right of way

- Major infrastructures:
  - Ports
  - Airports
  - Railway for goods

Base map:
- Lebanese University, main campus
- Relay cities
- Relay cities, capital of caza
- Main activity and logistic complex
- Gas powered plant
- Fuel tanks
- Ski resort
- Barrier constituted by high mountain
Figure IV.6: Principle for Public Urban Transport

Urban
- Localised urban public transport, schematic alignment

Inter-urban
- Regional inter-urban public transport, schematic alignment (primarily on the right of way of the old railway)
IV.4  TARGETED DISTRIBUTION OF MAJOR PUBLIC FACILITIES

The distribution of health, education, sport and administrative facilities in the cities and regions of Lebanon have significantly improved. Nevertheless, numerous zones of the territory could be better equipped, in terms of quantity, and especially in terms of quality of services offered by these facilities.

IV.4.1 A modern concept for the location of public facilities

It will be more convenient in the future to avoid mistakes of the past that have led, in the name of balanced development or simply in the name of equal distribution of public loans between the regions, to the creation of under-exploited facilities in the argument that funds (often in the form of loans) were available.

A just and reasonable definition of balanced development would consist in guaranteeing perfect equality among the regions for basic services like supply of water, distribution of energy and coverage of telephone network; executing adequate wastewater treatment works that go necessarily through different solutions for agglomerations and for small villages; and executing solid waste management facilities as at the convenient scale and in the framework of cooperation among neighboring municipalities. Other services go with objectives like allowing less than a 10 minute period for reaching an emergency service or a maternity hospital or a healthcare center, or permitting less than 20 minutes period for reaching a primary and elementary school, etc.

Relying on school and medical distribution or location maps that would become public is a determining element for setting up equality among regions, based on objective criteria.

IV.4.2 Education facilities

Universities constitute a major concern of the National Physical Master Plan, due to the fact that the University represents a structuring factor for land management.

The distribution of universities must abide by academic criteria, but they could as well contribute to the National Physical Master Plan objectives, especially the will of national unity, balanced development and rationalization.

The National Physical Master Plan recommends respecting the plan of the education authority, such as regrouping firmly their faculties, and creating synergies with the economic activities and social life of the surroundings.

These orientations are interpreted by the recommendation to regroup the Lebanese University in 4 campuses, each having specific faculties: the pole of Hadath in the Central Urban Area, the pole of Tripoli in the North, the pole of Zahle-Chtaura in the Beqaa and the pole of Nabatiyeh in the South.
Regarding technical and vocational education, the National Physical Master Plan recommends a larger grouping of public technical high schools to create units with an acceptable critical size from an academic point of view and to promote the intermingling of youth.

Technical and vocational high schools should therefore be distributed, in priority, on one hand in major agglomerations, and on the other hand in certain relay cities (maximum one per Caza, excluding major agglomerations).

As for the public schools, it would be appropriate to review their plans based on the following criteria:

- To take into consideration the fact that over the entire territory, the population between the ages of 4 and 17 years will become stagnant and even decrease in absolute value;

- To take into consideration the complementarities between the offered student seats by the private sector and the public sector. In certain towns, the additional offer by the public sector will be of no value if the demand is directed towards the private sector and if no increase in demand is registered for the existing public school;

- To target for planning purpose in terms of “number of student seats” to offer rather than “number of schools”, which doesn’t have much meaning;

- To review investment programs for establishing public schools once every five years in order to adjust supply to demand;

- To settle as a priority the problem of old, over-crowded, inadequate, or rented schools. The choice of replacing schools should be a priority over offering new ones;

- To rely on the school map, with a minimum of 75 students per school; and

- For any new offer, especially for the secondary schools, to privilege the “relay cities” and districts of large cities.

These orientations will allow setting a rational and coherent network of educational establishments, which would serve the entire territory in equal quality and level of service.

**IV.4.3 Healthcare facilities**

In the healthcare sector, the National Physical Master Plan recommends focusing the efforts on access to health services for maximum benefit, rather than on the quantity of new facilities.
Lebanon possesses currently enough health care centers and hospitals, even more than needed. Moreover, these facilities are distributed all over the country. The number of advanced technological equipment is more than needed in comparison with international standards.

At present, the challenge is the quality of services and improvement of access to existing health care centers and hospitals.

The improvement of the quality of the road network and a more efficient management scheme for transporting patients to required health facilities, represent adequate solutions for the current and future needs of the country.

In parallel, Lebanon will focus on the technical advances that will allow henceforth developing home-care methods and remote medical follow-up.

The complementarity of the offer between the private and public sectors must be better defined. As long as health care is being funded by the social security systems, the Ministry of Health subsidies and the private insurance companies, the public sector should abstain from competing with the private sector on similar services addressed to the same population. It should concentrate its supply only in regions deprived of sufficient supply by the private sector.

In the future, the issue of the public/private complementarities in healthcare offers should be the central concern of the state strategic reflections in health matters.

**IV.4.4 Electrical power**

Power supply has to be considered as an essential public service. Its role in the economy is unarguable, but it is also a determining factor of life conditions.

Lebanon’s needs for energy in 2030 are estimated at 4 200 MW, that is around 800 W per person. The following table presents the projection of needs for 2030, taking into consideration the hypotheses of the closure of the Zouk power plant by 2010 (loss of 600 MW) and the execution of the regional interconnection of 400 KV in 2005 (which allows reducing the reserve of the margin of excess capacity from today’s 30% to 10%).

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9 The evolution of the consumption per capita (including the needs for industrial and other economic activities) is estimated at 3% per year between 2002 & 2015, then at 2% per year between 2015 & 2025, and at 1% per year between 2025 & 2030.
Table 21: Projections of the energy demand for 2030

<table>
<thead>
<tr>
<th>Year</th>
<th>Population</th>
<th>Need per capita (W/capita)</th>
<th>Safety margin (%)</th>
<th>Total need (MW)</th>
<th>Existing power plants capacity in 2002 (MW)</th>
<th>Necessary additional capacity (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>4,080,000</td>
<td>430</td>
<td>31</td>
<td>2,300</td>
<td>2,300</td>
<td>0</td>
</tr>
<tr>
<td>2005</td>
<td>4,200,000</td>
<td>470</td>
<td>18</td>
<td>2,300</td>
<td>2,300</td>
<td>0</td>
</tr>
<tr>
<td>2010</td>
<td>4,400,000</td>
<td>545</td>
<td>10</td>
<td>2,600</td>
<td>1,700</td>
<td>900</td>
</tr>
<tr>
<td>2015</td>
<td>4,600,000</td>
<td>630</td>
<td>10</td>
<td>3,200</td>
<td>1,700</td>
<td>600</td>
</tr>
<tr>
<td>2020</td>
<td>4,800,000</td>
<td>700</td>
<td>10</td>
<td>3,700</td>
<td>1,700</td>
<td>500</td>
</tr>
<tr>
<td>2025</td>
<td>5,000,000</td>
<td>770</td>
<td>10</td>
<td>4,200</td>
<td>1,700</td>
<td>500</td>
</tr>
<tr>
<td>2030</td>
<td>5,200,000</td>
<td>800</td>
<td>10</td>
<td>4,600</td>
<td>1,700</td>
<td>500</td>
</tr>
</tbody>
</table>

The expansion of power generation is therefore unavoidable and important, and around 3,000 MW is needed in less than 30 years (taking into consideration the closure of the Zouk plant).

The investments required for the increase in power generation, energy transmission and distribution will be significant, about US$ 3.5 billion over this period.

It is then important to adopt in this sector a strategy with clear objectives and phases.

The objectives to accomplish are:

- Satisfaction of needs;
- Reduction of generation costs;
- Safety of transport;
- Safety of supply; and
- Control over the environmental impact of installations.

These objectives lead to strategic choices based on:

1 - The use of gas as a main consumable, taking into consideration its lower cost compared to oil and diesel, and its lower impact on the environment, without however neglecting the possibility of energy production using petroleum products, for reasons of securing adequate supply, and without omitting the possibility of other means of power production with renewable energy sources;

2 - The interconnection of Lebanese transmission network with the Syrian network to improve the safety of transmission;

3 - The reduction of the number of power generation plants. When the interconnection is accomplished, the majority of the Lebanese territory could be supplied with power from 2 or 3 national sites uniquely
chosen amongst the most modern ones. The other sites could be used for purposes other than energy production, and this will reduce their pressure on the environment and will allow some savings in production cost. Production must stop as soon as possible at Jiyeh and Zouk, as well as at many small thermal plants throughout the country. Hydroelectric plants could be maintained but these resources could primarily be used for irrigation purposes.

4 - The adoption of adequate phasing of investments as follows:

a) In 2005: Installation of gas conveyers to Deir Amar;

b) - In 2005: Building a new power plant at Deir Amar, with an eventual capacity of 1,500 MW with the installation of 500 MW in the first phase. This option is better than that considered by EDL in Selaata, for reasons related to cost of gas transmission and environmental impact.

- Dismantling the Zouk power plant.

c) In 2010: Building the second phase of the new plant at Deir Amar.

d) In 2015: Building the third phase of the new plant at Deir Amar.

e) In 2020: Doubling the capacity of the Zahrani plant. This option would not be adopted unless an economic study of gas conveyance confirms its feasibility. Otherwise, it will be necessary to increase the capacity in the North, given its proximity to the source of supply and consequently its lower investment costs.

f) In 2025: To build a new power plant or to expand an existing one to a capacity of 400 MW. The Deir Amar plant being close to the gas supply sources, it would be more appropriate to build the new plants in the North. However, for the security of refueling sources with reasonable prices, the production capacity could be distributed between the Deir el-Amar and Zahrani power plants.

g) The distribution network, where development must accompany production, would then consist eventually of almost eight 220 KV aerial and underground lines as well as 20 sub-stations.

h) The distribution network, aerial and underground, should be increased as well.

5 - The experimentation at a large scale the use of suitable alternative energy sources. It is worth testing in the plain of Akkar aeolian power production. Likewise, it is worth testing the solar energy production in the Beqaa valley. Experimentation for local use of solar energy could be carried out in the Beqaa valley.
IV.5 ENSURING A DISTINGUISHED URBAN DEVELOPMENT RESPECTING THE CHARACTERISTICS OF EACH REGION

The social and economic development will be accompanied with a growing demand for space and real estate for housing, activities and facilities.

Therefore, it is important to offer to the large agglomerations, as well as to smaller cities and villages, enough space to secure that they expand on lands well equipped with all infrastructures, without threatening the natural and agricultural national asset of the country.

This demand must be developed in a way that does not jeopardize the country’s most important resource, which is its territory. Land use must be in the utmost manner adapted to the physical characteristics of different regions, taking into consideration the inherited realities of the past and the future needs.

IV.5.1 Determine the preferential uses (vocations) of different parts of the territory

Based on objective scientific analyses, the National Physical Master Plan determined the preferential uses of the territory’s various parts in 4 categories:

- **Urban regions:** These are the regions where large cities have been historically developed and where urban expansion should be extended in the future. They are essentially constituted of buildings and managed roads, as well as numerous “open” spaces that are organized either as urban green spaces or used provisionally as car parks or for agricultural productions, or left in their natural state.

- **“Mixed” rural regions:** These are the regions that accommodate small cities and villages that are not attached to large agglomerations, as well as agricultural areas of unequal quality in addition to natural spaces that are not part of the important agricultural and natural entities of national interest. Thus, they are the most adequate regions for a “mountainous” or “rural” housing, and many of them possess important assets for tourism and summer holidaying.

- **Agricultural domain of national interest:** The regions classified in this category include the best agricultural lands of the country where irrigation networks either exist or are planned. The use of these lands for agricultural production purposes is a stake of national interest. Some of these regions are threatened by urbanization, but generally they are inadequate for housing as many of them are prone to flood risks.

- **Natural sites of national interest:** They are the regions that constitute a national importance for the conservation of water resources, forests and...
biodiversity. In general, they include the higher mountains, the great valleys and some places – in the North and in the South – that are vital to secure biological continuities for the flora and fauna. These regions, which contain several villages and some agricultural lands, are essential for the natural environment that constitutes one of Lebanon’s major assets for tourism and quality of life in nature.

Identify the agricultural domains of national interest

The identification of the regions of agricultural vocation has been made using the maps of soil classification and irrigation perimeters.

The analyses carried out, in the framework of a joint research program between the National Center for Scientific Research and experts in charge of the National Physical Master Plan, have taken into consideration multitude of criteria to produce the soil classification map, including: soil nature (pedology), soil depths, acidity, slope, irrigation possibilities, etc.

The soils have been classified into 5 classes, according to their suitability: Unsuitable for agriculture; Mediocre; Average; Good; and Excellent.

The National Physical Master Plan has adopted the 3 best classes (average, good, excellent) for the selection of the core of the agricultural domain of national interest. Lands of lower quality, but capable of being improved by future irrigation projects have been added to these regions.

Identify natural sites of national interest

The components of the regions with natural vocations are:

- The mountain peaks, generally above 1 900 m: These areas are important for the quality of water resources; they are also characterized by their vulnerable flora and fauna;

- The Cedars, Fir and Juniper Forests: These zones are in general located between elevations 1 500 and 1 900 m. Among them is the “Cedar and mountain trees corridor” isolated on the western slopes of Mount Lebanon;

- The Pine domain, which covers a considerable part of the western slopes of Mount Lebanon, between the coastline (outside of the agglomerations) and 1500 m elevation;

- Valley beds and slopes: These constitute of riverbeds and a rich vegetation on the side slopes of the valley; they play a major role in biological continuities, biodiversity and water resources quality; and

- Areas of continuity in plain and hilly zones: Such places are important in order to connect natural entities to each other, such as in the North between Mount
Lebanon and Anti Lebanon or in the South between Mount Lebanon and Jabal Aamel.

These regions with natural vocation also include specific sites, the preservation of which is a national duty, given their importance for the environment, the heritage or the tourist attractiveness of the country. The majority of these sites have been identified: they are elements of the geological heritage, natural wonders, natural areas of major biological (fauna and flora) interest and remarkable coastal sites.

**Arbitrate land use conflicts**

The designation of urban regions on one hand, rural regions on the other, then agricultural regions, and finally natural regions, shows many overlapping areas.

Land use conflicts are induced by these areas. Within the framework of the National Physical Master Plan, these conflicts are solved in accordance to the following criteria:

- Urban extensions of agglomerations represent an unavoidable imperative. In the case of a conflict with other vocations, urban regions take precedence first over rural regions, then over agricultural regions and finally over natural regions.

- Agricultural regions then take precedence generally over rural and natural regions (except in high mountains and steep valleys).

- Natural regions take precedence over mixed rural regions.

Hence, the general map of “vocations” for the different parts of the national territory is elaborated with a classification into 4 categories: Urban, Rural, Agricultural and Natural.

This map is one of the most important tools set by the Master Plan to control land use for the coming decades.

**IV.5.2 Promote urban quality**

The urban developments that will take place until 2030 provide an opportunity of a substantial improvement of urban quality.

In fact, over this long period, it is estimated that around 400,000 new dwellings would be built and at least 50,000 old ones would be destroyed, without counting thousands of various enterprises and facilities sites, and hundreds of kilometers of new roads, streets, avenues, boulevards and expressways. The cities and villages will extend from 40% to 50%. In a word, major evolutions are expected.

It is important to grab this opportunity to improve on what has been done in the past, practically on all fronts.
Architecture deserves a particular effort, including the joint efforts of architects, their Syndicates, municipalities and the State to ensure the progress of architectural quality in terms of form, material, style, harmony vis-à-vis the natural surrounding or built areas.

Legislation must evolve in order to improve the quality of urban centers and their insertion within their landscape environment.

In the cities, the rules of order and alignment must be researched. The juxtaposition of buildings could give good results, especially in flat urban sites (in the plane or along the roads following the contour lines).

In the countryside, the height of buildings must be better defined and harmonized. The height of a middle-aged pine tree must be the rule wherever it is possible throughout the western sides of Mount Lebanon.

The built-up heritage must be protected and esteemed. The protection of what has been finally preserved in the downtown of Beirut has shown that this heritage is endowed with a considerable attraction that recent buildings have not acquired yet. As heritage is the memory of the city, it is important to build cities that identify themselves through their history and their roots, instead of forgotten cities.

Last but not least, urban quality is mainly represented by the quality of public places. Sea front Cornices have an undeniable success in every coastal city. Similar cornices should be developed in mountains in order to open the view over great landscapes. The ordinary street, a major public place, must be the subject of a special attention, especially as far as pedestrian pathways and location of trees are concerned.

**IV.5.3 Organize urban developments in large agglomerations**

The elaboration of local land use plans in an urban area should be more often an opportunity to analyze, propose and implement complementary policies for the following features of the city:

- Archeological and historical heritage to be preserved totally or through its fundamental characteristics; this preservation should be conceived within the framework of both limited and extended perimeters, with appropriate rules for both;

- The “known” city that does not pose a particular problem and that should evolve in continuity with the existing development;

- Large opportunities on lands that can be recuperated from undeveloped lands and on which it is possible to conceive ambitious projects;

- The city “to be reconstituted”, namely the districts that are poorly structured, badly equipped and need restructuring efforts by means of new roads, public places, facilities and even amendments of existing buildings; and
The extensions, the coherence of which must be assured, by designing the basic skeleton network of roads and infrastructures, by adequate regulations capable of generating an urban planning that is not excessively expensive for local communities, and by defining the front lines that will separate the future city from the surrounding major agricultural and natural areas.

IV.5.4 Limiting scattered and linear developments

Between the years 2000 and 2030, urban sprawl will cover between 250 km$^2$ to 300 km$^2$, a growth of 42% to 50% compared with the current situation. The share of the Central Urban Area in this expansion will be 50 to 60 km$^2$, and similarly that of the other large agglomerations. Therefore, two thirds of the population currently living and who will live in the future in the large agglomerations will require 100 to 120 km$^2$ of extensions, which in 30 years will be between 40% and 50% of the urbanized lands. The other third of the population that live in rural regions will use as much land, if not more, to extend its cities and villages.

The fact that rural areas consume more land is understandable, the densities therein being less than urban zones.

But if this reality is understandable and acceptable, it is important that this need for land would not take forms that require uncontrolled expensive infrastructure.

The construction of infrastructure for lands to be urbanized in thousands of towns away from each other represents already a significant financial challenge. If the land in question is to be constructed in several thousand locations rather than in a thousand, the cost will be greater and the hopes for high quality would disappear. Thus, scattered construction is precisely the form of urbanization that increases to the extreme the number of localities (that need infrastructure). It is not only costly but is also responsible for the degradation of landscapes and sites as well as dissecting vast agricultural areas.

It is appropriate therefore to introduce serious measures for limiting scattered construction.

Moreover, it will be convenient to control linear developments along roads that provide inter urban connections. Linear development is the cause of decreasing traffic efficiency, increasing road accidents and thus deteriorating the quality of life. The best way to face this phenomenon is undoubtedly the development of municipal road networks in the immediate surrounding of cities and villages. In this context, a general national program to control this linear development phenomenon is necessary and would have useful effects.
Figure IV.7. The four dominant Land Uses
Figure IV.8: Principles for the Growth of Agglomerations

1. Densification of the city on the city
   - Demolitions, reconstruction, filling in voids, large projects, urban restructuring
   - Respect the architectural characteristics and traditional access
   - Respect urbanism and pattern
   - Engage the policy of either densification or de-densification and urban reconstruction
   - Search for opportunities

2. Peripheral extensions
   - The saturated city extends towards the peripheries on unconstructed lands, avoiding obstacles (slopes...)
   - Control the extensions: Quantitatively to avoid waste of land and scattering
     - In terms of location, taking into account the site constraints, flooded areas, protection of agricultural lands, discontinuity of urbanization, protection of natural areas, water vulnerable areas,...
   - Estimate the internal hosting capacities in function of the urban fabric
     - For example by calculating the density of buildings by hectare in a residential area
Figure IV.9: Central Agglomeration, Management Stakes
Figure IV.10: The Agglomeration of Tripoli, Principles for the Development of the Urban Area

- Medieval city and fishing port, primary to make good of Engineerings
- Promenade along the protected coastal area
- Major industrial area
- Urban corridor
- Principal road
- Highway
- Flooded areas
- Areas of extreme vulnerability
- Main agricultural area
- Concerning natural area
- Base map: scale 1/10,000
- Urbanized area 1984
- Contour levels
Figure IV.12: Agglomeration of Zahlé, Stakes of Urban Development

- Mode of major urban composition supported on the existing axis and on the topography
- Five major de-agglomeration urban axes
- Urban area and principles for extension
- Urban public transport
- Green belt inside the agglomeration supported by talwegs and contour levels
- Strict boundary of the urbanization to safeguard the agricultural plain

Constraints:
- Flooded areas
- Areas of extreme vulnerability
- Areas of water resources vulnerability
- Main agricultural area
- Dominating natural area

Base map scale 1:100,000
Unchanged area 1998
Contour levels
Figure IV.13: The Agglomeration of Baalbeck, Stakes of Urban Development

- Yamoune Valley
- Kornet Saouda
- Mount Lebanon
- Bekaa Valley
- Anti-Lebanon

- Major green belt
- Archeological sites and proximities
- Strict limit of the urbanization: maintain the agricultural plain
- Low land planted on the slopes of the Anti-Lebanon
- Major urban areas
- Urban areas and principles of extension

Constraints:
- Flooded areas
- Roads and rise of ground water level
- Areas of water resources vulnerability
- Areas of extreme vulnerability
- Main agricultural area
- Dominating natural area

Base map: scale 1:100,000
Urbanized areas 1995
Contour levels
Figure IV.14: The Agglomeration of Nabatiyeh, Principles of Urban Development
Figure IV.15: The Agglomeration of Sour, Principles of Urban Development
IV.6 RE-EVALUATION OF THE NATURAL WEALTH OF THE COUNTRY

The question of putting good use the natural resources is not an issue of principle or an ideological one, nor a matter of esthetics. It is first and foremost, a social and economic issue, in view of the importance of the natural resources in human life activities.

IV.6.1 The “green and blue network”, a notion of natural space continuity

Lebanon possesses numerous places, whose destination is precisely to remain in their natural state, for many reasons.

The first of these reasons is the protection of the most important natural resource of Lebanon, its water resource, which requires the protection of the mountain peaks (Lebanon’s water tower), rivers and valleys.

The second reason is the need to stabilize the steep slopes from excessive erosion risks by maintaining and developing their vegetation covers or at least by reducing the aggravating factors. This issue is highly important in the mountains, extending not only to the limits of vegetation, but also to the abandoned agricultural terraces, and most importantly to the slopes of the valleys.

The third reason is the need to conserve the remarkable biodiversity that characterizes the natural areas of Lebanon. This biodiversity constitutes a universal heritage and a great wealth that induce positive effects on the quality of life and health.

The fourth and the last reason is the need to protect what represents one of the major tourist attractions of the country, namely its forests, vegetations and natural landscapes.

Hence, the “green and blue network” project lies on the establishment and implementation of a global scheme for areas of natural vocations, which organizes their continuity and the profit attained there on, from the peaks down to the coastline.

The proposed scheme includes:

- Distinguished “specific” natural sites to protect: Inland, this concerns essentially geological heritage, fossil zones above Jbayl, natural bridges, natural wonders and astonishing rock formations, cliffs, grottos, caves and water falls. Along the coast, there are around twenty remarkable sites that should be preserved: sandy beaches, a certain number of rocks and cliffs, sweet water springs, more or less large bays (Grotte aux Pigeons the smallest, and the Bay of Jounieh the largest), etc.

- The zone of peaks, beyond elevation of 1 900 m, is to be preserved because of its importance in water resources and its fragility. This zone is unsuitable for
dwellings and due to rough climatic conditions, its fauna and flora are relatively poor and excessively fragile.

- The zone of Cedar and Juniper, between elevations of 1,500 and 1,900 m, is to be protected because of the quality of these species, coupled with a determination to develop them. On the western side of Mount Lebanon, this zone includes “Cedars and mountain Orchards”; efforts should be undertaken, so that it regenerates the Cedar and assures biological continuities between existing isolated Cedar woods, without omitting the possibility of a sustainable balance between the objective and the agricultural practices on one hand, and the creation of ski resorts on the other.

- The area of the Fir of Cilicie, a rare and endemic species of the Middle East that grows only in North Lebanon between the altitudes of 1,200 m and the level of the Cedars. This fir is often accompanied with other conifers. In this region, forests are still relatively very developed and act as a “welcoming place” for various animal species, especially large mammals.

- The land of Pines: It is the zone just downhill from the Cedars zone on the western slopes of Mount Lebanon. In these areas, construction overlaps with the natural environment. This is what makes the charm of Matn, Baabda, Chouf and Jezzine. A quality to be definitely preserved.

- The great valleys: The steep side slopes of the valleys make these zones unsuitable for construction. They are however very important for biological continuities, water and landscape qualities. It is therefore essential to free them from their current status as places for disposal of solid waste and wastewater, and re-establish their natural quality.

- Green incisions along the coast: There are two entities still well preserved on the coastal front, Ras Chaqaa and the southern zone between Bayada and Ras Naqoura. They represent the last witnesses of a landscape that was aggressively damaged by urbanization. Besides, there are other small scattered beaches or rocky witnesses (Enfeh, Grotte aux Pigeons) free of constructions that are worth protecting and rehabilitating. In the most urbanized parts of the coast, river mouths offer the possibility to avoid a linear urban expansion and it is appropriate to grab this opportunity in order to create green incisions that will contribute to the quality of life of each person.

- Access to the seashore and preservation of remarkable coastal sites: The National Physical Master Plan recommends a coastal management that secures public access to all the beaches and preserves the remarkable natural sites.
The coastal zones to preserve from all changes or to rehabilitate in their original status

The National Physical Master Plan recommends the preservation of a group of coastal sites from all changes according to their natural configuration (coastal line, essential characteristics, etc.). These sites and zones are as follows (from North to South):

Coastal dunes of Akkar plain
Salinas and wetland of Qlayaate
Palm Island
Seashore cornice and fishing harbor of Al Mina
Beach of southern Tripoli towards Qalamoun
Salinas, wall promenade and the phoenicien wall of Enfe
Promontory cape and cliffs of Ras Chaqa
Fishing harbor of Batroun
Beaches of Kfaraabida
Beaches in the south and north of Jbail
Fishing harbor of Jbail
Archeological site of Jbail and its maritime façade
Maameltein promontory
Bay of Jounieh and its promenade Cornice
Seafront Cornice of Ain Mreisseh in Beirut
The rock and the small bay of Grotte aux Pigeons in Beirut
Sandy beach of Ramlet el-Baida in Beirut
Sandy beaches of Jnah
Beaches of Damour
Ras es-Saadiyat rocky cape
Sandy beaches of Rmeileh and Jiyeh
Beaches north and south of Saida
Coastal promenade Cornice north of Saida
The Sea Castle of Saida
Sea façade of the old city of Saida
Mhayleeb scientific reserve
Tyre cape
Archeological site, old city and sea facade of Tyre
Fishing harbor of Tyre
Sandy beaches in the south of Tyre
Ras el-Ain springs
White cliffs of Bayada
White cliffs and bay of Naqoura
IV.6.2 A national natural park reserve in the North

The National Physical Master Plan recommends the establishment of an ambitious project of a national natural park in the North, including the mountain block of Qornet es-Sawda and the natural and forest areas of the North in the perimeter of Karm Chbat, Qammouaa and Fissane. This project that the authorities should support is based on the exceptional quality of the natural areas of this region, the preservation status of this zone and its very low urbanization rate. Classification of this area as a National Park must be accompanied with an active policy supported by the Government in order to support and revive the Park. It can generate important economic income for the concerned localities. In return, it requires the respect of very strict regulations in the matters of urban and road developments. North Lebanon and Hermel, both of which facing economic difficulties, can profit considerably from this project, the adoption of which should naturally be the jurisdiction of the Ministry of Environment.

The creation of this national park does not contradict a reasonable exploitation of the northern slopes of Qornet es-Sawda for winter sports. However, this type of development projects should take into consideration, in a very strict manner, severe environmental constraints to be implemented within the park.

IV.6.3 Numerous regional natural parks

The grouping of natural, landscape and heritage assets in a number of places justifies the elaboration of regional natural park projects. The concept of regional natural parks differs from the concept of a national park by the larger flexibility in the equilibrium to be established between nature and economic development.

A regional natural park is designed as a joint project with several neighboring municipalities, agreeing on a moderate and high quality urban development plan and on the conservation of the natural environment. It is based on this chart and on human and financial means that the municipalities would have planned to realize their projects, that the Government could classify the region as a natural park. This label provides to tourists and visitors a series of guarantees on the quality of life and the absence of disturbances. It is therefore a very important tourist argument. In other countries that have implemented such policies, many regions have been trying for years to acquire this label that constitutes a powerful factor for their development.

In Lebanon, the regions that are best prepared for regional natural park projects are the valley and the high circus of Qadisha, the valley and the high circus of Nahr Jaouz, the high valley of Nahr Ibrahim, the high valley of Nahr Beirut (“valley of Lamartine”), Barouk mountain range and the valley of Barouk, Bisri and Awali (Chouf reserve included), eventually extended towards West Beqaa, over the foothills of Aammiq and the lake of Qaraoun, the hinterland of Naqoura, etc. Other regions could claim such projects, like the region of Hasbaya-Rashaya-Hermon, or the region of Ayshiyeh-Rihane.
Figure IV.16: Green and Blue Sections

Natural setup and public beaches of the coastline

Discontinuation of urbanization

Preservation of ecotopes and wealth of the coastline

Public beaches

River mouths

Protected areas

Natural setup of the hinterland

High mountains: the water reservoir of Lebanon

Cedars and valleys

Valleys

Area dominated by forests or plantation and biological corridors

National park

Regional park

Nahr

The agricultural area of national interest with limited constructions, forms part of the green belt; the superposition of the agricultural and natural dominions are possible. In this case, the dominating domain will be chosen.
Figure IV.17: Principles for Making Good of the Coastline

- Disconnections of the urbanization
- Preservation of the ecological wealth of the seashore
- Public beaches
- River mouths
- Reserves
IV.7 A SUSTAINABLE DEVELOPMENT OF WATER RESOURCES

IV.7.1 An efficient development of water resources

Lebanon is endowed with hydraulic resources that, after evaporation and evapotranspiration, are limited to less than 5 billion m$^3$ per year. The exploitation of this resource is very difficult because of the morphology and the geology of the country, as well as the limitation of the rainfall season over 5 months per year, against 5 months of dry season and 2 months of limited rainfall.

Therefore, according to the unanimous opinion of experts, Lebanon could never exploit more than an annual average of 2.2 billion m$^3$.

Presently, Lebanon exploits around 1 billion m$^3$ of water through the Water Authorities\(^{10}\), and probably 250 million m$^3$ from private wells. 60% of this volume is generally used for agricultural purposes and 40% for domestic and industrial (the industrial share being negligible), with however significant system leakages in the public distribution systems (roughly half of the pumped volume).

The future water demands could be divided between domestic, agricultural and industrial demands.

The National Physical Master Plan gives the priority for domestic supply, given the critical situation of this part of the demand.

The satisfaction of domestic water demands in Lebanon in 2030 will require around 420 million m$^3$ (220 l/d/c x 365 d x 5.2 M people), namely an annual volume of 525 million m$^3$ to pump and distribute, with a system loss rate of 20% (against more than 50% today). This volume represents roughly 24% of the maximum exploitable resources.

Irrigation projects should be developed to the maximum allowed by corresponding public budget.

The irrigation sector mobilizes today around 650 million m$^3$, that is between 1/4 and 1/3 of the maximum exploitable resources.

The use of available water resources for agriculture, after satisfying the domestic and industrial demands, would mean the activation of around 1.6 billion m$^3$ for this sector in 2030. This would allow the irrigation of practically all the exploitable lands of Lebanon. This objective will be however very difficult to reach before 2030, given the constraints of public finance.

\(^{10}\) Estimates vary between 900 and 1 350 million m$^3$ of water distributed by the Water Authorities.
Table 22: Current and future use of water resources

<table>
<thead>
<tr>
<th>Sector</th>
<th>Current use (million m$^3$)</th>
<th>Future Demand in 2030 (million m$^3$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic water</td>
<td>195 – 405</td>
<td>525</td>
</tr>
<tr>
<td>Irrigation</td>
<td>670 – 875</td>
<td>1,600</td>
</tr>
<tr>
<td>Industry</td>
<td>35 – 65</td>
<td>140</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>900 – 1,345</strong></td>
<td><strong>2,265</strong></td>
</tr>
</tbody>
</table>

Source: For the currently used resources, compilation of different available studies.

IV.7.2 Water reservoir projects reconciling objectives with potentials

The financial difficulties of the State lead to giving more importance to reducing water system losses. In fact, maintaining a leakage rate of 50% would entail a 50% loss of investment.

However, the reduction of losses and leakages alone will not be enough to cover the demands and there will be a need to mobilize new resources.

Aware of the situation, the Government of Lebanon has developed a plan of surface water development, through the construction of 18 dams and 23 lakes, as well as 2 regulation weir in the Beqaa that would serve as spillways, rather than storage work. The capacities of the proposed dams vary between 4 and 128 million m$^3$, while those of lakes vary between 0.35 and 2 million m$^3$. The planned lakes are distributed evenly all over the country, especially on the eastern slopes of Mount Lebanon. From the 23 lakes, the locations of 17 are known, and 5 lakes are to be located in the Cazas of Marjaayoun, Bent Jbail, Hasbaya, Nabatiyeh and Tyre.

This plan, if executed, would allow mobilizing an annual volume of 1.1 billion m$^3$, bringing the exploited amounts (current and future) up to 2 billion m$^3$, which is very close to the maximum volume possible. Such a perspective could obviously resolve the problem of domestic water supply and assure irrigation water for the effectively irrigable lands of Lebanon (this is around half of the currently cultivated lands).

Nevertheless, it is unlikely that the Lebanese administration and public finance could accomplish this project in less than 30 years. The cost of the dams alone could exceed US$ 2 billion. There are also the distribution and irrigation networks to finance, which are evaluated in billions of dollars as well. Hence, this project should be perceived more as a development scheme, rather than a finalized and scheduled program.
Table 23: Proposed dams of the MoEW scheme

<table>
<thead>
<tr>
<th>Proposed dams</th>
<th>CAZA</th>
<th>Capacity (million m³)</th>
<th>Catchment</th>
<th>Spring</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shabrouh</td>
<td>Kesrouane</td>
<td>8</td>
<td>El-Kalb</td>
<td>Shabrouh</td>
<td>Under execution</td>
</tr>
<tr>
<td>Aassi</td>
<td>Baalback</td>
<td>37</td>
<td>El-Aassi</td>
<td>El-Aassi</td>
<td>Started / should irrigate 6000 hectares</td>
</tr>
<tr>
<td>Bisri</td>
<td>Chouf</td>
<td>120</td>
<td>Awali</td>
<td>Awali</td>
<td>In current detailed study</td>
</tr>
<tr>
<td>Boqaata</td>
<td>Matn/Kesrouane</td>
<td>7</td>
<td>El-Kalb</td>
<td>Boqaata</td>
<td>Feasibility study started / Promised for 2003</td>
</tr>
<tr>
<td>Dar Beashtar</td>
<td>Koura</td>
<td>55</td>
<td>Abou Ali</td>
<td>Abou Ali</td>
<td>To review feasibility</td>
</tr>
<tr>
<td>El-Hasbani / Ibl Saqi</td>
<td>Hasbaya</td>
<td>50 – 100</td>
<td>El-Hasbani</td>
<td>El-Hasbani</td>
<td>Feasibility study started</td>
</tr>
<tr>
<td>Bared</td>
<td>Akkar/Minieh Danniye</td>
<td>40</td>
<td>El-Bared</td>
<td>El-Bared</td>
<td>Feasibility study started</td>
</tr>
<tr>
<td>Qarqaf</td>
<td>Akkar</td>
<td>20</td>
<td>Aarqa</td>
<td>Deviation Aarqa+Wadi Jamous</td>
<td></td>
</tr>
<tr>
<td>Nahr el-Jaouz/Qalaat el-Msailha</td>
<td>Batroun</td>
<td>9</td>
<td>El-Jaouz</td>
<td>El-Jaouz</td>
<td>Feasibility study started</td>
</tr>
<tr>
<td>Younine</td>
<td>Baalbeck</td>
<td>5</td>
<td>Aassi</td>
<td>Deviation from Wadi Nahle</td>
<td></td>
</tr>
<tr>
<td>Janneh</td>
<td>Jabyl</td>
<td>30</td>
<td>Ibrahim</td>
<td>Ibrahim</td>
<td>Feasibility study started / Unsuitable Technical conditions</td>
</tr>
<tr>
<td>Noura et-Tahta</td>
<td>Akkar</td>
<td>70</td>
<td>El-Kabir</td>
<td>El-Kabir</td>
<td>Promised for 2005/ Only a part would be allocated to GoL</td>
</tr>
<tr>
<td>Azzounieh</td>
<td>Aaley</td>
<td>4</td>
<td>Damour</td>
<td>Safa</td>
<td>Unsuitable Technical conditions</td>
</tr>
<tr>
<td>Massa</td>
<td>Zahle</td>
<td>8</td>
<td>Litani</td>
<td>Litany</td>
<td>Study not yet launched</td>
</tr>
<tr>
<td>Damour</td>
<td>Chouf</td>
<td>60</td>
<td>Damour</td>
<td>Damour</td>
<td>Study not yet launched</td>
</tr>
<tr>
<td>Iaal</td>
<td>Zghorta</td>
<td>10</td>
<td>Abou Ali</td>
<td>Deviation Abou Ali + Iaal</td>
<td></td>
</tr>
<tr>
<td>Khardali</td>
<td>Marjaayoun</td>
<td>128</td>
<td>Litani</td>
<td>Litani</td>
<td>Study not yet launched</td>
</tr>
<tr>
<td>Kfarsir</td>
<td>Tyre</td>
<td>12</td>
<td>Litani</td>
<td>Litani</td>
<td>Study not yet launched</td>
</tr>
</tbody>
</table>

Source: Ministry of Energy and Water (MoEW) – CDR, 2002
### Table 24: Proposed lakes of the MoEW scheme

<table>
<thead>
<tr>
<th>Proposed lake</th>
<th>CAZA</th>
<th>Capacity (million m³)</th>
<th>Catchment</th>
<th>Spring</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yammouneh</td>
<td>Baalbeck</td>
<td>1.5</td>
<td>Yammouneh</td>
<td>Yammouneh</td>
<td>Under execution</td>
</tr>
<tr>
<td>Qaissamani</td>
<td>Baabda</td>
<td>0.55</td>
<td>Beirut</td>
<td>-</td>
<td>Under execution</td>
</tr>
<tr>
<td>El-Habash</td>
<td>El-Matn</td>
<td>0.55</td>
<td>El-Kalb</td>
<td></td>
<td>Draft accomplished / Promised for 2005</td>
</tr>
<tr>
<td>Qammouaa</td>
<td>Akkar</td>
<td>1</td>
<td>El-Aarqa</td>
<td></td>
<td>Feasibility study accomplished</td>
</tr>
<tr>
<td>Qatlab/Ottab</td>
<td>Akkar</td>
<td>1</td>
<td>El-Ostoune</td>
<td>-</td>
<td>Feasibility study started</td>
</tr>
<tr>
<td>Kouashra</td>
<td>Akkar</td>
<td>0.35</td>
<td>El-Ostoune</td>
<td>-</td>
<td>Feasibility study started / existing dam 0.12Mm³</td>
</tr>
<tr>
<td>Sbat</td>
<td>Baalbeck</td>
<td>0.70 – 1</td>
<td>Litani</td>
<td>Sbat</td>
<td>Feasibility study started</td>
</tr>
<tr>
<td>Jriban</td>
<td>Baalbeck</td>
<td>0.70 – 1</td>
<td>Litani</td>
<td>Jribane</td>
<td>Feasibility study started</td>
</tr>
<tr>
<td>Balaa</td>
<td>Batroun</td>
<td>1</td>
<td>El-Jaouz</td>
<td>-</td>
<td>Feasibility study started / Sensitive natural site</td>
</tr>
<tr>
<td>Laqlouq</td>
<td>Jbayl</td>
<td>0.80</td>
<td>El-Jaouz</td>
<td>-</td>
<td>Feasibility study started</td>
</tr>
<tr>
<td>Azzibe</td>
<td>Chouf</td>
<td>0.70</td>
<td>El-Awali</td>
<td></td>
<td>Feasibility study started</td>
</tr>
<tr>
<td>Maaser</td>
<td>Chouf</td>
<td>2</td>
<td>El-Awali</td>
<td>-</td>
<td>Feasibility study started</td>
</tr>
<tr>
<td>Brissa</td>
<td>Minieh/Danniyeh</td>
<td>1.2</td>
<td>El-Bared</td>
<td></td>
<td>Promised before 2005</td>
</tr>
<tr>
<td>Rashaya</td>
<td>Rashaya</td>
<td>&lt; 1</td>
<td>El-Hasbani</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lebaa</td>
<td>Jezzine</td>
<td>0.96</td>
<td>El-Awali</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kfarhounah</td>
<td>Jezzine</td>
<td>1.20</td>
<td>Litani</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unknown</td>
<td>Tyre</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unknown</td>
<td>Nabatiyeh</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unknown</td>
<td>Hasbaya</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unknown</td>
<td>Marjaayoun</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unknown</td>
<td>Bent Jbayl</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: MoEW – CDR, 2002
Priorities proposed by NPMPLT for lakes and dams

The National Physical Master Plan proposes to grant the priority for implementing the planned works (dams and lakes) based on 4 criteria:

- The capacity of the establishments to satisfy the domestic water demands. This criteria is twice as important compared to other criteria;

- The improvement that the work would bring to the irrigated lands;

- The possibility that the project could bring improvements to other objectives, especially tourism and protection against floods, and that it does not harm the environment; and

- Finally, the degree of progress of feasibility studies and implementation.

Concerning domestic water, priority is defined according to the quantities of potable water distributed by water authorities and per capita and per day, in peak periods, that will profit from this additional water amounts. Grades are hence distributed: (0) when current distribution quantity is higher than 250 l/d/capita; (2) between 150 and 200 l/d/capita; (4) between 100 and 150 l/d/capita; and (6) below 100 l/d/capita.

The priority for irrigation water, by increasing order, is defined as follows: (1) new irrigation networks have to be constructed; (2) provision of additional amounts of water would allow the improvement of the existing irrigation; (3) the region is currently a non-irrigated agricultural zone; and (4) when the primary infrastructure exists or is under construction and it would be necessary to associate the project with secondary and tertiary infrastructure development investment.

Concerning the other uses of the works: (1) touristic; (1) protection against floods; and (0) undermining remarkable sites.

Concerning the status of project progress: (0) some projects are technically not feasible or are not yet defined; (1) feasibility studies are to be launched or are ongoing; (2) detailed studies are under execution or the projects are planned for the coming 3 years; (3) the projects are already planned for the current year; and (4) the projects are under execution.

The grades obtained are added establishing the priorities shown in Table 25.
Table 25: The investment priorities of NPMPLT for the proposed dams and lakes

<table>
<thead>
<tr>
<th>Dams</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Noura et-Tahta</td>
<td>High</td>
</tr>
<tr>
<td>Bared</td>
<td>High</td>
</tr>
<tr>
<td>Iaal</td>
<td>High</td>
</tr>
<tr>
<td>Younine</td>
<td>High</td>
</tr>
<tr>
<td>Shabrouh</td>
<td>High</td>
</tr>
<tr>
<td>Massa</td>
<td>High</td>
</tr>
<tr>
<td>Al-Hasbani / Ibl Saqi</td>
<td>High</td>
</tr>
<tr>
<td>Aassi</td>
<td>Medium</td>
</tr>
<tr>
<td>Jenne</td>
<td>Medium</td>
</tr>
<tr>
<td>Boqata</td>
<td>Medium</td>
</tr>
<tr>
<td>Azzounieh</td>
<td>Medium</td>
</tr>
<tr>
<td>Damour</td>
<td>Medium</td>
</tr>
<tr>
<td>Bisri</td>
<td>Medium</td>
</tr>
<tr>
<td>Khardali</td>
<td>Medium</td>
</tr>
<tr>
<td>Qarqaf</td>
<td>Low</td>
</tr>
<tr>
<td>Dar Beashtar</td>
<td>Low</td>
</tr>
<tr>
<td>Qalaat el-Mseilha</td>
<td>Low</td>
</tr>
<tr>
<td>Kfarsir</td>
<td>Low</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lakes</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yammouneh</td>
<td>High</td>
</tr>
<tr>
<td>Qammouaa</td>
<td>Medium</td>
</tr>
<tr>
<td>Qartlab / Otlab</td>
<td>Medium</td>
</tr>
<tr>
<td>Kouashra</td>
<td>Medium</td>
</tr>
<tr>
<td>Sbat</td>
<td>Medium</td>
</tr>
<tr>
<td>Jriban</td>
<td>Medium</td>
</tr>
<tr>
<td>Azzibe</td>
<td>Medium</td>
</tr>
<tr>
<td>Maasser Chouf</td>
<td>Medium</td>
</tr>
<tr>
<td>Brissa</td>
<td>Low</td>
</tr>
<tr>
<td>Balaa</td>
<td>Low</td>
</tr>
<tr>
<td>Laqlouq</td>
<td>Low</td>
</tr>
<tr>
<td>El-Habash</td>
<td>Low</td>
</tr>
<tr>
<td>Qaissamani</td>
<td>Low</td>
</tr>
<tr>
<td>Rashaya</td>
<td>Low</td>
</tr>
<tr>
<td>Lebaa</td>
<td>Low</td>
</tr>
<tr>
<td>Kfarhouneh</td>
<td>Low</td>
</tr>
<tr>
<td>Other un-identified r.</td>
<td>Low</td>
</tr>
</tbody>
</table>

IV.7.3 A significant development of irrigation

The last plan for the extension of irrigated perimeters had been issued in 1972 for the period 1972-1977. It stipulated that an additional 81 500 hectares would be irrigated in addition to those already irrigated. Potentially irrigable surfaces have been evaluated at 74 000 hectares by the MoEW in 1991. A study on the agricultural potentials of Lebanon in 1980 (UNDP – FAO, 1980) has shown as well that 85 500 hectares are potentially irrigable, distributed roughly as in the 1972 decree.

At present, the MoEW and the Litani River Authority (LRA), the two major actors in this sector, have planned numerous irrigation projects for the coming years. These projects could be classified into two categories:

- Projects that allow improving and organizing the existing irrigation, especially in the Beqaa, where the LRA planned irrigating the entire plain; and

- Projects that aim at creating new irrigation systems.

The projects actually engaged are those of Aassi, Noura et-Tahta, Hasbani and South Lebanon (Conveyer 800), and priority should be granted to these already engaged 4 projects. Given their cost (around US$ 15 000 per irrigated hectare), these projects could be considered as major socio-agricultural development, i.e. their main vocation is essentially social.
The Noura et-Tahta and Aassi projects are being carried out under agreements signed with the Syrian Government for sharing the Nahr el-Kabir and Aassi waters.

The Hasbani project is important in order to revitalize the region and to encourage the farmers to return to the fallow lands abandoned during the Israeli occupation.

Detailed studies and the project of the Conveyor 800 are also being prepared.

The execution of these projects would only be useful if integrated into a global agricultural development strategy that organizes production and commercialization, and opens the markets to export. Besides, these projects require the adoption of a land related policy, concerning 2 issues: cadastral coverage of the potential irrigated land and the reduction of construction on the irrigable lands.

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### Current irrigation projects

The projects of rehabilitation of irrigation perimeters, chosen according to feasibility studies funded by the World Bank, are either accomplished or under construction. Other projects are already running such as South Beqaa, Qasmiyeh, Nahr Ibrahim, etc. However, the management of these irrigation systems remains questionable. A higher importance must be attached to the creation of committees of users as well as to the awareness of the farmers to improve the efficiency of irrigation and to make use of modern agricultural and irrigation techniques, to reach a sustainable and profitable production.

The most ambitious project currently under execution aims at irrigating 15,000 hectares of lands in South Lebanon. However, the present project is limited to the main pipelines. In order to benefit from this important investment, studies and construction of distribution systems for concerned perimeter should be a priority.

In the framework of the development of South Lebanon, following the liberation from the 20-year Israeli occupation, a socio-economic support is planned by the government to contribute to the stabilization of the population and to encourage the displaced population to return and to re-establish the agricultural, industrial and artizanal activities. Priority should be given to irrigate useful agricultural land.

The other irrigation projects, especially those associated with the dams of Aassi and Nahr el-Kabir, depend on the construction of the dams. The construction of Aassi dam has been recently confirmed.
## Table 26: The large irrigation and drainage projects planned or currently under consideration by the Lebanese Government

<table>
<thead>
<tr>
<th>Project</th>
<th>Surface (ha)</th>
<th>Spring</th>
<th>Cost M$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aassi</td>
<td>6 000</td>
<td>Aassi (Aassi dam)</td>
<td>50&lt;sup&gt;11&lt;/sup&gt;</td>
</tr>
<tr>
<td>Noura et-Tahta</td>
<td>5 000</td>
<td>El-Kabir (Nour et-Tahta dam)</td>
<td>50&lt;sup&gt;12&lt;/sup&gt;</td>
</tr>
<tr>
<td>El-Bared</td>
<td>750</td>
<td>El-Bared (El-Bared dam)</td>
<td>8&lt;sup&gt;13&lt;/sup&gt;</td>
</tr>
<tr>
<td>Younine</td>
<td>1 545</td>
<td>Younine dam</td>
<td>15&lt;sup&gt;14&lt;/sup&gt;</td>
</tr>
<tr>
<td>Converyer 800 South Lebanon</td>
<td>14 700</td>
<td>Litani (Qaraoun)</td>
<td>210&lt;sup&gt;15&lt;/sup&gt;</td>
</tr>
<tr>
<td>Water supply – Anane Nabatiyeh</td>
<td>3 500</td>
<td>Litani (Qaraoun) via Anane</td>
<td>35&lt;sup&gt;16&lt;/sup&gt;</td>
</tr>
<tr>
<td>South Beqaa – Left bank Phase 2</td>
<td>6 700</td>
<td>Litani (Qaraoun) + Aquifers + Springs Anjar and Chamsine</td>
<td>45</td>
</tr>
<tr>
<td>South Beqaa – Right bank</td>
<td>9 200</td>
<td>Aquifers</td>
<td>55</td>
</tr>
<tr>
<td>South Beqaa – North zone</td>
<td>5 600</td>
<td>Aquifers + Springs Anjar and Chamsine</td>
<td>30</td>
</tr>
<tr>
<td>South Qaraoun&lt;sup&gt;17&lt;/sup&gt;</td>
<td>865</td>
<td>Litani (Qaraoun)</td>
<td>5</td>
</tr>
<tr>
<td>Project of sewage and drainage of Beqaa</td>
<td>5 000</td>
<td>--</td>
<td>12&lt;sup&gt;18&lt;/sup&gt;</td>
</tr>
<tr>
<td>Qasmiyeh Phase 2</td>
<td>2 100</td>
<td>Litani (Kfarsir dam) + Aquifers</td>
<td>7&lt;sup&gt;19&lt;/sup&gt;</td>
</tr>
<tr>
<td>Khardali</td>
<td>13 000</td>
<td>Khardali dam – Middle Cretaceous aquifers pumping</td>
<td>95&lt;sup&gt;20&lt;/sup&gt;</td>
</tr>
<tr>
<td>Maissa – Yahfoufa</td>
<td>1 750</td>
<td>Wadi Yahfoufa (Litani tributary)</td>
<td>7&lt;sup&gt;21&lt;/sup&gt;</td>
</tr>
<tr>
<td>Saida Jezzine</td>
<td>1 200</td>
<td>Litani (Qaraoun) via Anane</td>
<td>6</td>
</tr>
<tr>
<td>Hasbani</td>
<td>5 000 – 15 000</td>
<td>Hasbani</td>
<td>50</td>
</tr>
</tbody>
</table>

<sup>11</sup> Source: MoEW. This price does not include the cost of the Aassi dam, estimated at US$50M.

<sup>12</sup> This cost is an estimate. It does not include the cost of the dam, estimated at US$50M.

<sup>13</sup> This cost is an estimate. It does not include the cost of the dam, estimated at US$50M.

<sup>14</sup> This cost is an estimate. It does not include the cost of the dam, estimated at US$5M.

<sup>15</sup> Source LRA. This cost includes the water supply that has a double use (irrigation – potable water), but does not include the cost the management and equipment per parcel, estimated at US$ 220M.

<sup>16</sup> Source Dar al-Handasah. The price of Anane reservoir capacity increase is not included. The cost of the conveyer is of double use (irrigation – potable water) and does not include the cost the management and equipment per parcel, estimated at more than US$ 30M.

<sup>17</sup> Source LRA. This project includes irrigated lands in rehabilitation and a part in extension.

<sup>18</sup> Source LRA. This cost does not include the drainage per parcel at the farmers charge.

<sup>19</sup> Source LRA. This cost does not include the cost of Kfarsir dam, estimates at US$ 12M.

<sup>20</sup> Source LRA. This cost does not include the cost of Khardali dam, estimates at US$ 145M.

<sup>21</sup> Source LRA. This cost does not include the cost of Massa dam, estimates at US$ 16M.
Figure IV.18: Priority Projects of Dams and Lakes
Figure IV.19: Condition of Irrigation Projects
**IV.8 EFFECTIVE SOLUTIONS TO THE PROBLEMS OF QUARRIES, WASTEWATER AND SOLID WASTE**

The quarries, the sewage systems and the solid wastes constitute three major problems in Lebanon that are still not resolved. The stakes of these three issues are considerable for the public health as well as for the quality of life of the population.

**IV.8.1 Extracting building material without endangering the quality of life**

Lebanon requires 3 million m$^3$ of aggregates every year (in general, 70% of gravel and 30% of sand), without counting exceptional demands linked to large projects. The extraction of these materials requires the mobilization of roughly 50 hectares per year for rock quarries and 20 hectares per year for sand quarries.

The solutions applied to date to reduce the environmental damages of these activities have often failed.

A Master plan for the management of quarries (especially gravel quarries) was prepared in 1995 and 1996; it delineated the exploitable deposit sites based on a number of economic and environmental criteria. But the Lebanese Government did not succeed in establishing a consensus on this plan.

The Government decided afterwards to restrict gravel extraction to several sites located on the Anti-Lebanon Range. However, access and transportation difficulties have hindered the implementation of this decision.

Many illegal quarries continue to operate in the country. Police operations have allowed the closure of certain sites, without guaranteeing that activities will not restart due to increasing demand for material.

Material import, presented as an alternative to quarries, has faced the opposition of quarry operators and building and public works professionals.

In the absence of a satisfactory solution, the prices of materials have increased significantly. The reasons for this increase could not be determined (retention of stocks or actual scarcity of resources).

It is important therefore to learn from previous management efforts in this sector and to propose a coherent policy for the future.

Thus, the National Physical Master Plan proposes the following principles and measures:

- Lebanon should, as much as possible, satisfy its own demand for construction material. This is a concept of sustainable development. Transferring the problem to other countries ought to be considered as a last resort.
It is appropriate to define the regions where all sand and stone for gravel (other than decorative stones) extraction activities are strictly forbidden. These regions should be defined according to simple criteria: Banning should be implemented within a perimeter of 500 m all around classified natural reserves, as well as protected sites and monuments, inhabited zones, coastlines and rivers. It should also be implemented to dense forest areas, mountain peaks (above 1,900 m) and Cedars corridor.

Quarries should be considered as classified industrial activities, and they should be submitted to complete environmental impact assessment studies. These studies should be as stringent as the planned extraction areas are important.

Obligation to rehabilitate the sites should be reinforced: Operators should submit enough financial guarantees for site rehabilitation. The rehabilitation plans should be agreed upon previously.

Legislation concerning extraction activities, whether it is for exploitation or for improvement of agricultural lands, should be homogenized, modernized and completed.

Penalties in the case of regulation infringements should be strengthened. For sand extraction, legislation should highlight the absolute necessity to preserve the vegetation soil that must be spread again on the site after exploitation.

Applications for the authorization of exceptional land and real estate development projects, especially landfills, dikes and jetties, should include designs and specifications concerning the materials to be used, including precise designation of the requested extraction sites, quantities, type of materials and roads for transportation of such materials. This information should be part of the contract between the applicant and the relevant authorities. These applications should also include economic studies and environmental impact assessments, concerning not only the project sites, but also on the extraction sites and the roads to be used for the transportation of material. Hence, the authorities should be able to generate a global opinion with full knowledge of the facts.

It is possible that, with these measures, Lebanon will lack sand, particularly due to the protection of the large forests of the country. The imports and the shipments of sand, e.g. from Egypt, could help stabilize the market prices.

It is also possible that future land reclamation projects become too expensive, on the environmental and infrastructure levels, to allow authorizing new large scale landfill projects of private nature. The crisis of the quarries should limit landfill practices to only unavoidable public projects (ports, terminals, etc.).
Figure IV.20: Areas to be Excluded from Quarrying Activities
IV.8.2 Adapted solutions for sewage treatment

The main criterion for sewage treatment plants recommended by the National Physical Master Plan is the preservation of public health through the protection of water resources.

Priorities of Facilities

The rate of connections to sewer networks and the individual practices of wastewater disposal still remain below the expected levels in almost all the country. The ultimate objective would be to attain a total coverage of the entire territory, whether by sewage systems or by individual solutions, with the guarantee of an adequate treatment before their discharge into ground water, streams or into the sea. This should be accomplished in phases, because of high costs and management problems:

1- **In the short term**, the priority should be given to 2 categories of “localities”:
   
   - On one hand, mountainous regions located in areas of extreme vulnerability of water table, tapped by downstream villages and cities for domestic supply: For these regions, the works should encompass collection of sewage water as well as treatment;
   
   - On the other hand, in large agglomerations, where rehabilitation and extension of networks is needed, treatment should be of second priority, except for interior agglomerations (Baalbeck, Zahle-Chtaura and Nabatiyeh), where they must constitute a priority.

2- **A second phase** will consist of endowing the isolated towns with more than 5 000 permanent residents (that represent altogether around 17% of the localities) with collective treatment plants for groups of localities.

3- **The last phase** that will probably come at the end of what would be possible to do until 2030 will concern towns with 2,000 to 5,000 permanent residents (25% of the localities).

With the execution of the plan on the long term, almost 80% of the urban surface would be covered.

Until then, it is important to refrain from executing collection networks when the collected wastewater would be released into sites presenting a danger for downstream water use for potable water or food supply (contaminated agricultural produce or fishing).

Priorities of treatment plants

The Sewage Master plan adopted by the CDR, as a guideline for the investment in this sector, was established in 1982, and updated in 1996.
The planned wastewater treatment plants (WWTP) are currently 34, of which one is already built and eight are in the pipeline for construction. It is therefore possible to refine the criteria for the selection of the remaining 25 plants proposed in this Plan.

By adding the groundwater and surface water protection criterion to the other criteria (the number of persons served, the possibility to reuse the effluent and the existence of funds), it appears that the priority plants, in the CDR scheme, should be those of Saghbine-Joub Jannine, Qaraoun, Hasbaya, Hrajel, Zahle, Jbrayel, Bent Jbayl, Mishmish and Bakhoun, all of them located in the hinterland, characterized by high risks of groundwater and surface water pollution.

The construction of these WWTP should be followed, in a second phase, by those of Hasroun, Besharreh, Khenshara, Jbaa, Laboueh, Mazraat ech-Chouf, Qartaba, Anjar, Amioun, Shaqra and Hermel, and then in a third phase, by those of Tyre, Tabarja, Daoura, El-Aabdeh and Ghadir.

However, it is possible that additional investigation regarding the impact of wastewater on the water table could lead to identifying other sites to be treated in priority. Such a careful examination should be carried out essentially in the Cazas of Chouf, Aaley, Matn and Kesrouane, characterized by important areas with high water resources vulnerability. This investigation should lead to refining the CDR sewage scheme, and deduce other priorities, particularly to protect the water resources of Greater Beirut.

The construction and operation of domestic WWTP must be accompanied by the implementation of MoE decision concerning industrial wastes, as well as article 39 of Decree-law 444, dated July 29, 2002, concerning the protection of the environment.

The treatment of industrial wastes released into the Litani watershed should have a high priority. Particular attention should also be granted to chemical and food-processing industrial wastes in the rest of the country. It would be convenient as well to allocate particular attention to car workshops illegal disposal of waste, especially in high and medium mountain areas, where they could pollute the groundwater and springs.

Management of the sewage sector

Management of the treatment plants is the responsibility of the 4 newly-created Water Authorities, established in 2002. They are also responsible for the studies, construction, operation and the maintenance of these plants and networks. This would have a better consequence on the integration of the water sector.

Problems of expropriation and the disagreements of local population as well as the divergence of opinions between various ministries have blocked many projects for which funding had already been secured. In the future, it would be appropriate to eliminate the overlaps of responsibilities that lead to these obstructions. The responsibilities of the municipalities, the new water authorities, the Ministry of Environment and the Ministry of Interior should be properly defined. In the same
way, the need for skilled staff should be identified and technical and administrative capacities reinforced.

Economic feasibility of the various projects must be judiciously studied. The adopted level and technique of treatment should be closely linked to the construction and operation costs. Many villages and municipalities could be regrouped, in most cases, in order to decrease costs. It is important to study the issues of taxes, charges and cost recovery mechanisms capable of assuring a balanced account of the sewage sector.

The amount allocated by the CDR for the construction of sewage projects for the period 2003-2005 is around US$ 750 million. That is a significant amount, the funding of which is obtained at 30% from external sources (and expected at 80% from the same sources). However, the availability of external funding should not be the determining criterion for identifying projects: On one hand, the external funding can concern projects of less priority than others, and on the other hand, it can disappear if the problems of local expropriation or acceptance by the population are not resolved.

**IV.8.3 Solutions for solid waste treatment adapted to the local contexts**

Similar to the sewage treatment sector, the main criterion for the solid waste sector recommended by the Master Plan is public health, to which other concerns are added, such as economy, preservation of environment and tourist attractiveness.

**Domestic wastes**

The domestic wastes issue concerns essentially disposal sites, whether they are controlled dump sites or landfill sites coupled with sorting and recycling.

Optionally, the waste issue concerns treatment processes before disposal. Incineration has been put aside for financial and environmental reasons. Recycling must be encouraged, without forgetting that their development will certainly face financial obstacles for a long time.

In the short term, it is crucial to remedy, as an emergency, the critical situation of large agglomerations, especially Tripoli, Saida and Beirut, by mobilizing necessary lands and by rehabilitating degraded sites. Together with this effort, it is important to plan short-term solutions for the cities of Tyre, Nabatiyeh, Baalbeck and Jbayl, followed by the rest of the country.

For the medium and long terms, a complete sorting, recycling and treatment plan should be established and implemented.
Figure IV.21: The Priorities in the Actual Sewage Master Plan
The major factors to consider in the conception of landfill sites are the following:

1- The quantities received by these sites: they should be diminished; therefore, it is important to reduce them at the source, to recycle and to transform the wastes. The main aspects taken into consideration are:

   - Reduction at the source, mainly by reducing wrapping material (that could be taxed) or by using recycled, recyclable or biodegradable materials.

   - Selective sorting, at the source (which improves the quality of recoverable materials) or at the plant (material recovery).

   - Recycling: The main issue to discuss in this matter lies in the widening of the markets for recovered material and the encouragement/support of recycling industries. At present, recycling is carried out at small scale; more encouragements are needed to create a large scale operation.

   - Composting: Currently, the Coral composting plant of Greater Beirut and several small local plants are operational. The major problem is that, due to bad sorting at the beginning, the quality of the compost is not accepted by the farmers. Another problem is the low capacity of the plant, incapable of treating all the organic materials produced in Greater Beirut. The composting plant should be preferentially located near the sorting plants, and close to major “consumers”.

2- Transportation distances: the sites should be located the nearest possible to the waste sources or they should include a transfer facility in an appropriate location. Their access should be always easy through the roads network.

3- Meteorological and hydro-geological conditions: These are important environmental aspects to take into consideration. All the adequate technologies for the monitoring and the reduction of environmental pollution should be established. They include the selection of leachate management (collection and treatment), the selection of gas monitoring (collection and treatment) that include as well, if feasible, the transformation of gases to energy, and finally the selection of environmental monitoring facilities (air and groundwater quality, as well as monitoring of gas and liquid contents of the vadose zone).

4- Selection of sites: The unions of municipalities, assisted by administrative and technical support, from MoE and MoI at the Caza or Mohafaza level, should unite their actions to select landfill sites and locations for sorting and composting facilities. This should be carried out in the framework of a pedagogic effort and public consultation, the omission of which could induce trouble. The management and operation of the landfill sites are very important as well. A private company could be hired for carrying these activities on behalf of the municipalities, if these lack the technical and administrative
competencies. The municipalities should be encouraged to sub-contract the operation rather than counting on the CDR or other central administration.

5- Collection: The collection of waste is functioning relatively well; municipalities have either commissioned private companies for the collection or are collecting the waste by themselves especially in rural regions.

6- Rehabilitation of old dumpsites: Especially those of Saida, Tripoli and Beirut. These dumps are causing major environmental problems and generate important public turmoil. The introduction of new controlled landfills is unavoidable in the Cazas, because the existing ones have reached their capacity limits. The problem of Naameh landfill site is more than evident. It is essential to examine the operation and control criteria to improve the present situation.

Hospital and hazardous wastes

Hazardous waste dumpsites should be located away from residential areas, in areas with suitable hydro-geologic conditions. The precautions to avoid environmental pollution should be strengthened (transportation, emission, leachate, etc.). A hospital waste treatment central incinerator has been planned, but no adequate site has been identified yet. Four hospitals have their private incinerators, but their conformity with environmental standards is unknown. The new public hospital of Beirut has installed an incinerator with a capacity of 1.5 tons / day. Nevertheless, due to public pressures, the hospitals have interrupted waste incineration and have replaced this practice temporarily with autoclaving, until a permanent solution is selected.

Industrial wastes

Industrial wastes should be treated in situ according to their type, then transported to the landfill sites. The MoE has already defined the criteria for the release of industrial effluents into the public sewer systems as well as for conditions where pre-treatments are required. These conditions are supposed to be immediately applicable for new industries and a 5-year grace period is granted for existing industries.

Selection of dump sites

Lebanon should mobilize annually around 40 hectares of land for solid waste landfill sites (with an average depth of 20 m), of which more than half is required to serve Greater Beirut and Mount Lebanon. Nevertheless, this area could be reduced to 10-15 hectares, with an adequate compacting.

The selection of sites must be viable from the political, social and technical points of view. Technical and administrative criteria must constitute the basis for the selection procedure that, later on, has to account for political and social considerations.

The factors to be analyzed for determining the suitability of landfill sites are, in particular, hydro-geology and groundwater, topography and environmental impacts. Appropriate hydro-geologic conditions consist of a complex combination of type and
depth of soil and distance between groundwater and the surface. As for potential environmental impacts, the most critical is the degradation of water resources.

The sites, however, must be close enough to residential areas to reduce transportation costs and time, but at the same time, distant enough to reduce land prices and to find land parcels sufficiently large to accommodate those sites.

An overall analysis of the Lebanese territory, on the basis of these two fundamental criteria (distance from urban areas and vulnerability of water resources), allows to draw a map indicating the zones where establishment of landfill sites would be best avoided (see the following map).

The sites with moderate or poor adaptability conditions, however, should not be necessarily excluded, but it is noteworthy that these sites are more expensive to manage (need for surface pavement and leachate collecting systems, etc.).

Several old quarry sites could be used as landfill sites, but this perspective should be subject to specific case by case studies, measuring the risks for water and air pollution, as well as the impact on public health, landscapes and sceneries.

Ongoing projects

Two projects that serve the Cazas of Jbayl (Hbaline: 120,000 m$^3$) and Baalbeck-Hermel (Taybeh: 151,000 m$^3$) are under construction. The Hbaline project includes a landfill site and equipment at a cost of US$ 7.2 million, funded by the World Bank. The Taybeh project includes a landfill site, a transfer station in Hermel, the rehabilitation of the uncontrolled dump site at Kayyal and the purchasing of equipments, at around US$ 3.9 million also funded by the World Bank.

The CDR 5-year plan proposes the construction of controlled dumpsites in the Cazas of Akkar, Tripoli-Zghorta, Besharreh-Koura-Batroun, Tyre-Bent Jbayl, Nabatiyeh-Hasbaya-Marjaayoun and West Beqaa-Rashaya. This plan includes the construction of transfer stations in Bent Jbayl and Marjaayoun-Hasbaya, as well as treatment plants in Besharreh-Koura-Batroun, Tyre, West Beqaa-Rashaya, Saida, Tripoli and Zahle. It also includes the rehabilitation of uncontrolled dump sites in the major cities of Tripoli, Saida, Baalbeck and Tyre. It is important to allocate a site for Saida-Jezzine, while Minieh could be connected to Tripoli-Zghorta.

The majority of the required works is already planned. They are essential for an adequate management. Their execution depends on the financial feasibility study.

The approximate cost of these projects is roughly US$ 115 million (80% from national funds): This cost does not include the possible site of Saida-Jezzine, but includes the feasibility study for the transformation of wastes into energy in “uncontrolled” dumps sites. The execution of this process in Bourj Hammoud could be revealed very soon, as international funding is secured, but conditioned by the contribution of US$ 3.5 million from national resources.
However, environmental monitoring is still not considered in the budget of the new dump sites.

USAID had allocated US$ 15.3 million for local waste management projects. They would serve 446,000 persons in the 185 villages in Chouf, Jbayl, Jezzine, Hasbaya, Hermel, Nabatiyeh and West Beqaa. They include staff-training projects. This type of projects could be extremely beneficial for the towns, provided that the municipalities participate actively and take control of the management later on.

Administrative aspects

The Ministries of Environment and Interior should work together for an adequate management of this sector. The participation of the MoE in the choice of sector strategy, in the selection of sites according to technical and environmental criteria and in monitoring of the operation would be crucial for a sustainable management. The participation of the MoI in identifying potential sites, expanding administrative and financial know-how and every other support to the municipalities constitutes the critical aspect of the success. The reinforcement of technical and administrative capacities in these two ministries is essential for a successful and sustainable management.

The financial situation of the municipalities is definitely the major constraint that hinders the correct functioning of the waste management sector. Theoretically, the municipalities have the right for taxes and remuneration from 35 different sources, but they face major collection problems, without counting the retention of one part of their revenues by the Government (that are allocated against expenses carried out by the GoL on their behalf).

In order to change the situation, there are two reform aspects to be considered: either a fixed allocation for waste management, regularly paid by the GoL to the municipalities, or a real decentralization of responsibilities that would give the municipalities more clear control over tax collection related to solid waste management. This solution would be preferable, but it has to be implemented in an inter-municipal framework (federations or union of municipalities).
Figure IV.22: Guidelines for Excluding Areas from Sanitary Landfills

Legend
- Faults, Landslides
- Poutou Aquifer
- Very Shallow Aquifer
- Shallow Artesian
- Karstic Aquifers:
  - Low Vulnerability
  - Medium Vulnerability
  - Vulnerable
  - High Vulnerability
- Urbanized Areas

Sources: Dubertret (1966) / IAURIF
processed by: CNRS / DAR / IAURIF
V

PRINCIPLES OF LAND USE
CHAPTER V

PRINCIPLES OF LAND USE

The map of “soil vocations, assets and constraints” attached to this study shows the general vocations of the soils, as well as their assets and constraints. It gives the general framework for the elaboration of local urban planning documents, master plans, detailed plans and regulations. It offers as well valuable indications for a certain number of sectoral policies that make use of the territory in one way or another, such as solid waste, sewage, industrial polluting waste or quarries.

The present chapter presents the recommendations of the National Physical Master Plan related to Land Use in accordance with their classification as shown in this map.

These recommendations are presented respectively for:

- General vocations for land use: urban, mixed rural, agricultural rural, and natural;
- Constraints: floods, landslide hazards, and water resources pollutant vulnerability areas; and
- Assets: major natural and heritage sites.

For a given location concerned either by a vocation and a constraint or an asset, or even by the three of them, the relevant recommendations are compiled and the most “strict” principles are applied.
V.1 THE LAND USE PRINCIPLES IN URBAN, RURAL, AGRICULTURAL
AND NATURAL AREAS

V.1.1 Land use in urban areas

Urban areas correspond to the country’s large agglomerations. These areas were defined taking into consideration their expansion for the coming 25 to 30 years. At present, they already contain 2/3 of the resident population of Lebanon, and the majority of industrial and tertiary activities of the country.

These areas are able to receive all kinds of dwellings, activities, natural and landscaped areas, various technical facilities and equipment, etc. The only excluded land use therein concerns quarry activities. The most hazardous industries could be established within these areas, but on specific dedicated lands, separated from dwelling areas by a buffer zone of non-polluting industries and open spaces.

High construction densities could be accepted within the center of urban zones, the outskirts being endowed with specific regulations adapted to their situation and location.

Urban planning for these entities must be conceived by emphasizing the order (front alignments, common parts, façades, etc.), functionality (traffic, parking, access to facilities and commerce, etc.), urban quality, design of public spaces (the street, the square, the pedestrian circulation, etc.), importance of trees and natural spots, and privileged views (over the mountain, the sea, etc.).

Several parts of the urban areas are located in mountainous areas, and therefore have a special residential character for summer holidaying or tourism. In these cities, relatively high construction densities (6 or 7 levels) can be accepted in certain cases, although the general recommended rule is to respect the height of middle-aged pine trees. It is especially the urban character (alignments, heights, materials, architecture, etc.), the vegetal cover and the remarkable heritage location that must be submitted to specific limitations.

The development of these agglomerations along topographic contour lines, rather than roads serving higher villages, will allow a more rational land use and a more pleasant urban framework (just like it was in Aaley for example, after its development along with the railway station at the beginning of the XXth century).
Figure V.1: Urban zones foreseen by the NPMPLT
V.1.2 Land use in the main agricultural areas

The main agricultural areas of national interest have been delineated within the rural regions taking into consideration the best agricultural lands of the country, as well as the perimeters concerned by irrigation projects. Hence, the natural land use in this area should be limited, theoretically, to agriculture. The importance of this limitation is greater since the majority of the large agricultural entities has high flood risks and must be considered as unsuitable for construction.

The agricultural lands should profit from projects aiming at quality and output improvements: irrigation projects, agricultural land consolidation, access to the lands, etc. Such projects should be part of a national strategy for agricultural development by modernizing the processes and means of production.

Isolated constructions on major agricultural lands

It is legitimate that the major agricultural lands of the country could, exceptionally, receive buildings and infrastructure intended for farming or agro-industry that require being close to the agricultural lands or even to the individual dwelling of the farmer or the owner.

Besides, these agricultural lands of national interest should be restricted from commercial real estate operations. What should be allowed is agricultural land consolidation or a consolidation as a result of inheritance or land property shares, but never for real estate housing developments. It is also important to avoid, in the absence of local urban planning regulations, opening new agricultural roads or asphalting existing ones. The classification of agricultural lands must precede opening or restoration of roads.

Wastewater treatment facilities, proposed landfill sites or other facilities that cannot be located near villages could exceptionally be located on major agricultural lands, if no other alternative is available in a given area. It is appropriate however to select, amongst the lands, those with the least agricultural value.

Cities and villages within the agricultural areas

Some old hamlets in agricultural areas have developed, especially during the last 10 years, in the center of major agricultural areas. These have been often transformed into real villages and even relatively important cities. The floods during the winter of 2003 have brought up the consequences of challenging nature and the natural vocation of lands. Nevertheless, these cities and villages exist now and a policy for their development should be defined. The only suitable policy consists of managing their urban development as a close continuity of existing districts, as long as a local urban plan has not specified other options.
Figure V.2: Major agricultural areas of national interest foreseen by the NPMPLT
V.1.3 Land use in the mixed rural areas

The mixed rural areas are areas that contain small cities and villages, agricultural lands with modest dimensions or low productivity, as well as natural areas that could have an importance at a local level, but not at a national level.

These areas are located outside the major agricultural areas of national interest.

The cities and villages of these areas benefit from agricultural, local trade, internal tourism and eco-tourism income.

Construction in these constituted cities and villages

The relay-cities included in this area, with usually 3 000 to 10 000 permanent residents (across the year), fill up the essential functions that serve surrounding villages. These cities would be supported by urban planning and an architecture that respects the identity of the area, especially in terms of construction materials, colors, and height of buildings. As a common rule, it is appropriate to keep low construction heights, not exceeding, if possible, the height of a middle-aged pine tree.

The villages, other than the relay-cities, should conserve their rural aspect, because this constitutes an essential asset for their attractiveness and the quality of life for residents. This can be done through the conservation of soft urban forms, especially as far as building heights are concerned: the height standard will be defined by the local tradition (G+2 usually), or by the height of a middle-aged pine tree. Once more, the material to be used, the forms and colors should be in harmony with the local traditions.

Whether it is cities or villages, the dwellings in mixed rural areas should stay, as possible as could be, clustered within a perimeter. Extensions outside existing districts should be limited by adequate regulations established by local urban plans that should be developed.

Sites of development outside town perimeters

Some building projects are located on parcels outside the perimeter of towns. These parcels are therefore away from existing districts, and are located on agricultural or natural lands.

Such projects could be small projects (a villa or a restaurant), medium projects (a residential building or a hotel), as well as big projects (residential parcellation, seaside resort, large hotel), and even larger operations (leisure club or large residential parcellations).

The will to preserve agricultural and natural areas, and safeguard public resources and finance, lead to implementing selective rules for this kind of projects.
The general rule should be demanding: with the lack of approved local urban plan and planning regulations in mixed rural areas, all residential projects, located outside the perimeter of constituted cities and villages, should have a specific size. The objective is not to authorize, outside the villages, except operations with a certain dimension that justifies the provision of infrastructures (i.e. a minimum of 3,000 m$^2$ of exploitable area on a single parcel, or plots with a minimum area of 20,000 m$^2$). These authorizations should be coupled with the obligation, to the developer to finance the necessary infrastructures (namely electric supply, water supply and sewage systems), and then transfer them over to public property.

A greater flexibility for approvals should be provided to real estate enterprises (hotels and restaurants, non-polluting industries, etc.), and for the establishment of hazardous facilities and industrial zones outside villages and cities. However, this flexibility should be coupled with stricter regulations in terms of architecture and compatibility with the surrounding landscape.
Figure V.3: Mixed rural areas foreseen by NPMPLT
V.1.4 Land use in natural areas

Land use in natural areas is necessarily restrictive. Three entities are distinguished:

A - The high mountains above 1,900 m altitude;
B - The Cedar and mountain tree plantation corridor;
C - Valleys, forests of quality and other zones of ecological continuity.

A – The high mountain areas above 1,900 m altitude

Above the altitude of 1,900 m, and taking into consideration the fragility of the environment and its sensitivity vis-à-vis the water resources and erosion risks, modifications made by human intervention should be closely evaluated and reduced to the minimum possible.

In case of absolute necessity, electricity poles, tele-transmission antennas, poles and mechanical stations for ski resorts, and agricultural facilities (sheepfold, hill reservoirs, etc.) or military installations could be accepted. The roads necessary for national connections crossing the ranges of Mount Lebanon and Anti Lebanon, and shown in the National Physical Master Plan should be managed in a way to reduce their environmental impact on all levels.

Besides, it is appropriate to avoid creating new roads across the mountain peaks, and to implement adequate rules to ban the construction of housing estates and quarries. The Municipalities and the Government should also discourage all kinds of automobile sports in these areas, for the considerable damages that these sports could cause, in an irreversible way, to the wild flora species, and to the pollution risks of groundwater resources.

The mountain peaks could be subject to strengthening legal protection measures, within the framework of a Mountain Law.

B - The Cedar and mountain tree plantation corridor

The “Cedar and mountain tree plantation corridor” is located on the western slopes of Mount Lebanon, between elevations of 1,500 and 1,900 m. It is appropriate to the altitudes of the natural forests of the Cedar (Cidrus libani), as well as to plants of high altitude.

This area, rarely inhabited, has a capital importance, in the sense that it represents the emblem of Lebanon, the Cedar. The Cedar forests are in danger of becoming extinct because of their scattered condition. The first objective of a reasonable management of
this area would thus be to re-establish the ecological continuities all along this corridor, by reforestations and valorization of associated natural sites.

This zone also includes rich agricultural areas, mainly containing fruit trees, vineyards and seasonal vegetable crops. The development of agricultural activities, based on adequate irrigation projects (especially from hill reservoirs) is not contradictory with the abovementioned objective, as long as this activity does not break the ecological continuities.

Finally, this corridor is also the area where ski resorts are located, with their corresponding constructions: parking, host buildings, mechanical tow machinery, hotels, restaurants, chalets, etc. It is rare to see constructions not linked to ski activities. Ski resorts could not be excluded from the “Cedar corridor”, but these tourist real estate developments should be conceived respecting the natural vocation of the corridor. Authorization requests for similar projects must imperatively be associated with detailed environmental impact assessments (EIA), including the impacts of the resort buildings, access roads and parkings, as well as related real estate developments (hotels, chalets, etc.).

Concerning industry, the rule must be the exclusion of all industrial activities, other than those of mineral water with the requirement of an EIA.

Other modes of real estate and road developments should be by principle banned.

C – Valleys, forests and other areas of ecological continuity

Besides the areas of mountain peaks and the Cedar corridor, areas of natural vocation include 3 other categories: valleys, forest zones and other areas of ecological continuity.

The valleys

Lebanon’s great valleys are major elements of natural, tourist, landscape and agricultural heritage. They control as well the quality of streams and rivers. Their preservation is essential.

The most remarkable valleys are those of Nahr Moussa, Nahr Qadisha, Nahr el-Jaouz, Nahr Ibrahim, Nahr Bisri (Barouk-Bisri-Awali), and the Litani “elbow” valley in the South. Other remarkable valleys are those of Nahr el-Kalb, Nahr Beirut (valley of Lamartine), Nahr Es-Safa and Nahr ed-Damour.

For all these valleys, it is appropriate to implement specific regulations in order to safeguard the natural characteristics of the valleys and to manage the urban planning of

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1 The highest village of Lebanon, Bqaa Kafra, is situated between elevations of 1 500 and 1560 m. All the other villages are below 1 500 m. The only secondary residences and chalets that are not directly linked to ski resorts and that are beyond 1 500 m are those of Laqlouq.
the surrounding villages. In parallel, actions should be undertaken for reforestation, limiting solid and liquid waste discharge and preserving the steep slopes from soil erosions.

These actions could be usefully supported and shared by municipalities concerned by these valleys, developing together touristic, agricultural and environmental coherent projects of high quality.

The same approach could be applied to less majestic valleys, facing similar problems.

In general, the projects to be developed by priority would concern sewage treatment, solid waste management, quality of run-off water and management of the green vegetation. Special eco-tourism activities and construction could be conceived, taking into consideration respect of the environment.

Villages located on top of hills must be capable of developing in harmony with the natural character of the areas. Architecture, building heights, materials, etc. must match the natural set up of the village. Urban expansions must be in continuity with existing villages. The sceneries must be preserved by regulations for buildings located downside the cornices.

Building regulations for the villages located on steep slopes should be more severe. Construction outside the perimeter of the agglomeration should be avoided and constructions must avoid slopes higher than 30%.

In lowlands, the existing villages could develop in continuity with existing constructions, with respect to the surrounding natural set up and avoiding the pollution of streams (even the seasonal ones).

Industries could be accepted in these areas, but away from rivers and streams, provided they are equipped with treatment facilities for their effluents.

The forests

Forests other than the “Cedar corridor” include primarily, on one hand, Firs and Juniper (protected species in Lebanon, like the Cedar) and on the other hand, large Pine forests of Mount Lebanon, the North and the South, and finally forests of Oak.

The Lebanese forests are nowadays located essentially (more than 80%) on public land State-owned land, and on Meshaa and Awqaf lands. Therefore, it is appropriate first of all to preserve the legal status of these properties everywhere forests exist and perpetuate. Concerned authorities should establish management mechanisms, permitting the maintenance of forests.

It is also vital that the woods and forests located on Meshaa lands be preserved, without allowing any activity that might affect their development such as quarries or grazing.
Concerning private forests, it is appropriate to take actions to save them not to become extinct under the growing pressure of real estate activities. Hence, the authorities, Government and Municipalities, should avoid road developments in forest areas. Strict urban planning regulations should also orient constructions towards non-forest areas.

**Other zones of ecological continuity**

The National Physical Master Plan has defined zones of ecological continuity, other than mountain peaks, valleys and forests. These areas play a major role in maintaining the natural continuity between Mount Lebanon and Anti Lebanon, as well as between the mountain ranges and other remarkable natural entities, especially the region of Naqoura in the South and Nahr el-Kabir at Wadi Khaled in the North.

In these zones, the priority should be given to the natural setup. Regulations for Construction and other activities should be defined in accordance with this objective.
Figure V.4: Natural areas of national interest foreseen by NPMPLT
Many Lebanese regions have important advantages that could be exploited in a sustainable way. These advantages represent an asset that could constitute a source of income for many generations. Therefore, it is essential to preserve and exploit these regions.

These advantages or assets are:

- Landscapes;
- Historical heritage; and
- Coastal areas.

**V.2.1 Landscape assets**

Landscape assets can be major physical landscapes, picturesque villages, natural wonders or important natural sites, sites of exceptional sceneries, etc.

**Major landscape entities**

Other than the coastline and the landscape of large agricultural plains (Beqaa, Akkar, southern coast), Lebanon possesses other major landscape entities that constitute its identity, its quality of life and its tourist attractiveness. These are in particular:

- The high valley of Nahr Abou Moussa / Nahr el-Bared in the Akkar;
- The valley of Qannoubine (Holy valley);
- The high valley of Nahr el-Jaouz;
- The high valley of Nahr Ibrahim;
- The high valley of Nahr el-Kalb;
- The valley of Nahr Beirut (valley of Lamartine);
- The valley of Nahr el-Barouk / Nahr Bisri / Nahr el-Awali;
- The valley of Nahr Litani between Qaraoun lake and bridge of the Qaaqaaiyeh;
- The highlands of Mount Hermon;
- The hills of the South (Caza of Bent Jbayl); and
- The valley of Yammouneh.
Land use in all these regions should take into consideration the need to preserve this natural wealth. This should be done through the implementation of strict rules on construction heights, materials and construction development, since bad construction wrongly implemented or located can deteriorate a whole landscape.

It is also appropriate to avoid quarry activities that could endanger the character of landscapes.

Inter-municipal programs could usefully help these regions through valorization actions: plantations, organization of site visits, advertisement billboards, etc.

Picturesque villages

The number of picturesque villages has significantly decreased in Lebanon during the last 20 to 30 years. However, there still remain a large number of them, characterized by traditional architecture (stones, arcades, tile roofs, etc.) or a particular configuration of streets and buildings (terraces, tiers, stairs, semi-private roads, etc.) or other particular elements (vegetation, site, etc.).

The picturesque character of a village has always been a considerable factor of its summer holiday and tourism attractiveness, and constitutes therefore an appreciable source of income for the inhabitants.

Local authorities should establish regulations and enforce them to strengthen this character.

Remarkable natural sites

The National Physical Master Plan has listed some of extremely valuable natural sites, the absolute protection of which is a national stake. The cascades of Jezzine, the natural bridge of Faqra, numerous grottos and caves, etc. are only a part of the Lebanese remarkable natural sites.

All available legal instruments must be mobilized to assure the strict protection of the site in a restricted perimeter, and its valorization in a larger perimeter.

The restricted perimeter must include the site itself (sink of Balaa, bay and rock of Grotte aux Pigeons, natural bridge of Faqra, etc.). There should be an absolute protection against all construction. The access to these sites must be executed with natural material like sand or stone, to avoid damaging the natural set up, with concrete for example.

The enlarged perimeter extends to a radius to be defined according to vision and access to the site. Adapted rules of construction and management must be decreed in order to preserve the scenery and reduce negative impacts of expected constructions, installations and facilities that may, if introduced, obstruct vision of these sites. In general, industrial
establishments, high-tension electricity pylons, and all polluting activities should be
avoided in this perimeter.

**V.2.2 Historical heritage assets**

The historical heritage, whether it is archeological or recent, has vital importance in the
tourist economy and in contributing to the country’s history.

**Classified historical sites**

The historical sites enlisted in the Directorate General of Antiquities (DGA) are sites
known for their important historical, cultural, heritage and often tourist value.

The local urban plans should preserve these sites with strict measures.

The local urban plans should identify protection perimeters around these sites and define
valorization methods adapted to the situation of every site and endowed with adequate
valorization regulations.

**Non-classified built heritage**

Ancient districts of cities and villages represent often a major interest in terms of
heritage, culture, etc. The example of rehabilitated and safeguarded districts in the
downtown of Beirut shows the attractive power of these areas.

Many Lebanese cities, and the majority of the villages, contain entire districts with
valuable heritage that contribute to their identity.

Local urban plans and other legal and technical instruments should be mobilized to
safeguard and bring out this wealth and its related memories.

**V.2.3 Coastal zone assets**

The valorization of the coastline is important not only for tourist development, but also
for the quality of life in coastal cities. It requires a series of complementary regulation
and operational measures that should converge to give Lebanon back its agreeable and
attractive coastline.

The major assets that the coastline offers are:

- Sandy beaches, very limited along the coast (about twenty);
- Exceptional sites (Ras Chaqaa and Enfe);
Remarkable natural sites, such as cliffs, rocky capes, bays, natural wonders and others (about ten);
Natural shorelines with high ecological and landscape values, such as dunes, natural wild media, rocky plateaus, islands, etc. (about ten);
Urban seashore promenades and cornices (shorelines of large cities);
Picturesque ports (of coastal cities).

The preservation and valorization of these assets require a more severe re-definition of possible and expected coastal land use, especially on maritime public domain and neighboring lands.

The National Physical Master Plan recommends the following actions:

For sandy beaches

The sandy beaches, which are maritime public domain, constitute a rare resource in Lebanon. Therefore, it is important to assure free access to the public, to protect these beaches from sand extraction and litter disposal, and to properly manage and maintain them.

Opening of the sand beaches to the public should be carried out in the framework of a global free sea-access policy and free passage width of minimum 3 m along the coast.

For the exceptional sites of Enfe and Ras Chaqaa

The coastal site of Enfe, with its Phoenician wall, its Salinas and stones, should be enlisted as a historical heritage, as well as natural heritage (Reserve).

The Ras Chaqaa site deserves to be classified as a natural reserve. This is currently being studied by the MOE.

The classification of these sites must be accompanied by action plans aiming at restoring and preserving them, and organizing tourist visits to the sites.

For remarkable natural sites along the coastline

The Lebanese coastline has a few numbers of natural sites that constitute an integral part of its identity and give to the neighboring towns a special advantage in terms of quality of life and tourist attractiveness.

Along the Northern coast, these sites are gradually diminishing. Other than the Palm Islands, the remarkable natural sites are limited to the sites of Enfe and Ras Chaqaa, as well as to the bay of Jounieh. Their character should be preserved against every whim to change it, whether it is through inconvenient landfills or other jetty and bridge projects.
The sandy beaches of Chekka, Batroun, Jbayl and Maamelteïn are the last sandy beaches remaining in the northern coast of Lebanon.

In Beirut, the sea front of Aïn Mreïsseh, the rock and the bay of the Grotte aux Pigeons, as well as the white trail of sand of the Ramlet Bayda are three remarkable sites that are an integral part of the capital’s identity. Here again, it is imperative to preserve their natural status and character against every possible development project.

Along the Southern coast, sand beaches are more numerous: Jnah (to be re-oriented to seaside use), Khaldeh, Damour (sand and pebble), Jiyeh, Rmaileh, Saïda, Sarafand, Aadloun, Qasmiyeh and Tyre (at its north as well as at its south). Other remarkable natural sites are much more preserved: capes (Saad Rath, Nabi Younes, Sarafand, etc.), cliffs (Bayada, Naqoura) or coastal freshwater springs (Ras el-Aïn, to be rehabilitated), etc. It is essential to preserve this wealth that represents a sustainable support to tourist and social development.

For the seashores with high ecological value

It is appropriate to underline the high ecological value of certain parts of the Lebanese seashore, for the protection of terrestrial as well as maritime natural media. It is especially the case of the maritime façades of Akkar (dunes), Tripoli-Qalamoun, Barbara, Jbayl-Maamelteïn, Sarafand, Qasmiyeh and Tyre-Naqoura.

The ecological wealth of these zones is often linked to alluvial deposits (Qasmiyeh, Nahr Ibrahim, Nahr el-Bared and Estouane, etc.), to the preserved condition of natural systems (dunes, rocky plateaus) and to the surrounding urban pressure.

It is important to manage these parts of the coastline taking into consideration that these are the last sections of the natural coast still undisturbed by human activities and intervention.

The development projects of these zones should be submitted to EIA studies once they exceed a certain dimension. The MoE and the authorities in general should monitor the proper management of these seashore sections.

For the seashore promenades and cornices

The seashore promenades and cornices constitute an unequalled wealth for the coastal cities. They are the natural escapes of the residents of these cities, as well as important tourist spots.

The municipalities have been aware of this wealth, which explains the attention that has been always given to the cornices, such as in Tripoli – El-Mina, Beirut (Aïn Mreïsseh, Raoucheh, Ramlet el-Bayda), Saïda and Tyre.
It is important to preserve and develop this wealth, and to avoid, for the existing cornices, blocking the views of the strollers (as is the case of some places in Beirut). It is also required to create new cornices for coastal cities that do not have yet any.

For traditional ports

Picturesque ports follow the same logic of the seashore cornices, to which they are almost always connected. They are “traditional” fishing harbors, such as in Tripoli, Jbayl or Tyre. In these three cities, it has been proven that the preservation of the traditional character of these harbors exerts an exceptional attraction over tourists and wanderers.

As such, it is important to preserve this asset from any possible mismanagement that could abolish this attraction power. It is also important for cities that possess such harbors, but haven’t highlighted their value, to strive for their adequate management.

These harbors remain first of all fishing harbors that need regular maintenance and modernization. However, their tourist asset, which represents a significant source of indirect income to the fishermen themselves, should not be lost\(^2\) as a result of any modernization activity.

For public access to the seashore and the use of maritime public domain

In the particular case of Lebanon, marked with numerous coastline abuses, the definition of a coastline wealth valorization strategy requires necessarily resolving of the issue of the maritime public domain use, as well as the use of its surroundings.

The maritime public domain, in the Lebanese legislation (the decree 144/a, dated 10 June, 1925), is defined as being the aquatic port and the coast to the farthest distance the waves could reach in winter, as well as sandy and pebble beaches. The seawater ponds and marshes linked to the sea are also a part of the maritime public domain.

The first rule to restore in this matter is the issue of free public access to the seashore.

The National Physical Master Plan recommends the establishment of a systematic continuous servitude of 3 m wide passage in contact with the sea, except on dangerous sites (rocky cliffs, escarpments, etc.) or on zones reserved for industrial (commercial ports, factories, pipelines, etc.) or military uses.

Beyond this 3 m wide passage, the general rule is that the maritime public domain must remain *non aedificandi*, but can receive provisional facilities (without foundations) of seaside resorts that are dismantled at the end of each season. The municipalities should specify the conditions of installing these facilities.

\(^2\) This orientation is however in perfect harmony with the strategy that should be adopted for the fishing sector, namely the upholding of traditional fishing that can support a large number of families in a *numerus clausus* assuring them a sufficient income given the low wealth of the Lebanese waters with plankton.
In some cases, the Government could authorize, by special Decrees, the provisional use of maritime public domains by the bordering property owners for tourist or industrial purposes. These exceptional legal dispositions should not be in contradiction to public Laws. There has been an extensive interpretation of the Law that prohibits the use of a maritime public domain surface of more than twice the surface of the bordering parcel. Thus, the developer finds himself systematically granted the right to use the maximum surface (twice the surface of his parcel); and in case, the coast does not offer the totality of this area, the remaining part is taken from the sea, often as landfills or marinas with jetties.

The National Physical Master Plan could not recommend dispositions that are not in strict respect of the Law. It is thus important that everyone that has encroached illegally on maritime public domains, with fixed installations, withdraw into their private parcel and dismantle the totality of these installations on public domains (dwellings, hedged gardens, swimming facilities, hotels and restaurants) as soon as possible. This measure does not exclude the possibility, if the law authorizes, of granting the users the permission to establish temporary installations, but the situation concerning taxes and indemnities (for the previous illegal occupations) should be settled first.

The objective is to institute a situation in which seaside resorts benefit financially from the services they offer to the visitors, rather than from the “privatization” of portions of public property.

The case of “hard” constructions on the maritime public domain, especially hotels and marinas, built previously and in a semi-legal status (as they have been authorized by decree) should be treated case by case, seeking the best way to allow free public access to the seashore. The beneficiaries should at least execute at their expense compensation measures that allow the public to by-pass the obstacles on their way to public properties, and concurrently, they should settle their taxes and fines with the public Treasury.

For the future, it is recommended that the decrees authorizing the use of public domain be based on a public interest notion that figures in the law and should foresee the conditions in which the public could have free access to the shore.

When requests for public domain occupation concern remarkable coastal sites (cliffs of Bayada, springs of Ras el-Aîn, Grotte aux Pigeons, etc.), the decrees will have to specify that the natural set up of the coast can not be modified in any case and that all fixed installations are prohibited.
V.3 THE RULES TO RESPECT IN CONSTRAINTS PRONE AREAS
(NATURAL HAZARDS AND WATER RESOURCES VULNERABILITY)

V.3.1 Flood hazards prone areas

The National Physical Master Plan has mapped the flood hazards prone areas. They consist of 3 categories:

- Flood prone areas due to shallow water table, beneath a porous soil, where water level is likely to rise, as a result of a significant water runoff (it is the case of plains, namely the Beqaa and Akkar);

- Flood prone areas due to the increase of river flows (it is the case of Abou Ali and El-Kabir rivers, for example);

- Flood prone coastal areas induced by high tides.

Some areas are subject to all these three types of flood hazards, such as the Qasmiyeh plain.

The precautions to be taken in these areas should assure the safety of inhabitants, the safety of people going to schools, hospitals etc. and the safety of properties. The forms of construction that render the soil impermeable that would increase the flood intensities and create obstacles to water flows are to be avoided.

Hence, the rules to be considered are the following:

- Highly reduced construction rights;
- Prohibition of real estate development for residential purposes;
- Non-establishment of public facilities;
- Non-obstruction of river flows;
- Construction of a “piles floor” that would be considered as a separate floor;
- The prohibition of closed fences, in order to facilitate water drainage;
- The obligation to maintain a minimum of 80% of lands with garden, lawn, orchard or vegetables (non-impervious soils).
There are however cities and villages in Lebanon that have developed in the center of flood prone areas. In these cities and villages, the above-mentioned rules should keep on being implemented, as long as the flood prone perimeter has not been protected by adequate construction. The execution of such works is possible for floods induced by torrential river runoffs. On the contrary, it is impossible for floods caused by the rise of the water table in plains.

V.3.2 Landslide prone areas

In landslide prone areas, it is imperative that urban planning regulations reduce the possibilities of construction on higher than 10% natural slope lands. Excavation and filling works that would decrease the slope are not adequate solutions; they could even worsen the problem.

Certain regions are subject to general landslide hazards that concern tens of neighboring villages. In such cases, the entire region should be subject to a specific urban planning policy that intends to reduce urban development.

Industries and public facilities should not be accepted in these zones. Quarries, housing parcellations and large scale constructions should be submitted to environmental impact assessment studies.

V.3.3 Areas of extreme water resources vulnerability

The zones of faults and fractures represent an extreme danger for groundwater pollution and consequently, for water resources that supply domestic and potable water demands.

Different treatments should be considered for every situation:

- Where water vulnerability zones are already urbanized, it is imperative to construct, as soon as possible, necessary wastewater treatment plants, as well as to transfer solid waste, and to regulate activities by prohibiting generating workshops and factories producing chemical pollutants.

- Where water vulnerability zones are used for agricultural purposes, work should be carried out towards decreasing the use of chemical fertilizers and pesticides, and to converting towards organic agriculture or returning to the land its natural condition. It is also important to take legal measures limiting the possibilities of construction and prohibiting the establishment of polluting activities therein.

- Where water vulnerability zones are still in their natural condition (forest, scrub, bare rocks, etc.), it would be appropriate, as far as possible, to maintain this condition and to avoid urbanization.
Impact assessment studies should be a condition for allowing construction in these areas. Authorization for housing parcellation projects in these areas should be conditioned by the construction of sewage systems (wastewater and rainwater), prior to the construction of access roads and any other construction.

These preventive measures will be clearly less expensive on the health of the population, as well as on public and private finances, than a policy that would only remedy the effects of carelessness in groundwater pollution issues.

V.3.4 **Major industrial hazards prone areas**

There are numerous industrial zones in Lebanon that present major hazards in case of fire, an explosion or an accidental leakage of dangerous solid or liquid wastes. A safety perimeter, according to the danger extent, should be considered in urban planning. In this perimeter, it would be appropriate to avoid residential development, and if dwellings exist already, to avoid their expansion. School and health care facilities, and more generally, all public facilities or activities should be prohibited.
Figure V.5: Sites with especial assets foreseen by NPMPLT
Figure V.6: Vulnerable Areas Taken into Consideration by the NPMPLT
V.4 OVERALL PRESENTATION OF NPMPLT’S RECOMMENDATIONS FOR LAND USE

In order to clarify previously mentioned land use regulations, these have been summarized in three tables in the following pages.

The entire territory is covered by the classification of table 27, which means that each area in Lebanon is classified as U, R, A, N1, N2, or N3. On the other hand, tables 28 and 29 concern only one part of the territory: those that are subject to constraints (table 28) and those that possess major assets (table 29).

The vocation map allows assessing the situation of each zone in the territory (classification U, R, A, N1, N2, N3 / Asset description / Existence of constraints). It is thus appropriate to refer to the corresponding column in table 27 and eventually to the columns concerning the given area in the tables 28 and 29.

For a given area concerned by both a vocation (table 27) and a constraint (table 28) or an asset (table 29), or the three of them, the considered recommendations are added and it is the most “severe” principles that are adopted. For example, in an “R” class area (Rural) subject to a flood hazard, the recommended density of construction would be “very low” (as indicated in table 28) and not “average” (as indicated in table 27).

The areas covered by approved local urban plans remain managed by these plans, as long as they are not modified, or a higher regulation (general decree, law, etc.) that would be contradictory to their dispositions is not decreed.

The elaboration of new local urban plans or amendments of old ones should respect the rules considered in tables 27, 28 and 29. However, if a deeper knowledge of the local geographic realities, while elaborating new plans, lead to minor adjustments of the rules making them more rational, this adjustment could be beneficial but should be seriously justified.

The particular case of areas not-covered by approved local urban plans

Land use regulations in the areas without local urban plans should evolve: the new regulations should respect and implement the dispositions of tables 28 and 29. As far as building permits are concerned, their classifications in these regions as U, R, A and N will not be taken into consideration: all regions that are not covered by a local plan will be managed by the general regulations.

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3 The category “A” (Agricultural domain of national interest) includes essentially agricultural lands, but also the villages at their center. The category “N” (Natural domain of national interest) includes essentially natural areas, but also the villages at their center.
should be endowed with a restrictive “national regulation”, inspired from the one considered for zones A (Major agricultural domain) in table 27⁴.

**Table 27: Recommended regulations for construction, quarries and industrial establishments in Urban, Rural, Agricultural and Natural areas**

<table>
<thead>
<tr>
<th></th>
<th>U Urban</th>
<th>R Rural</th>
<th>A Agricultural</th>
<th>N1 Peaks</th>
<th>N2 Corridor of Cedars</th>
<th>N3 Valleys &amp; links</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compactness³ of urbanization</td>
<td>Not required, except for forest area boundaries</td>
<td>Recommended</td>
<td>mandatory</td>
<td>Not applicable (no urbanization possible)</td>
<td>mandatory</td>
<td>mandatory</td>
</tr>
<tr>
<td>Density (Built up surface areas)</td>
<td>High, except near forest areas</td>
<td>Average in towns, low on outskirts, very low in forest areas</td>
<td>Average in towns, low on outskirts, very low on distant areas, in forest areas and in large agricultural entities</td>
<td>Construction limited to military and technical installations (pylons)</td>
<td>Very low except for ski resorts (average density)</td>
<td>Low, except in center of cities and villages (average) and prohibition on slope &gt; 30%</td>
</tr>
<tr>
<td>Heights</td>
<td>High, except in forest areas</td>
<td>G+2, except in towns (G+3)</td>
<td>G+3 in centers of towns, G+2 on suburbs, G+1 in sensitive areas (forests, groundwater intakes, …)</td>
<td>Not Applicable</td>
<td>G+1, except in center of towns (G+2) and ski resorts (considered in large scale projects)</td>
<td>G+3 in center of towns, G+2 on suburbs, G+1 in forest, agricultural and natural areas</td>
</tr>
<tr>
<td>Classification of housing parcels</td>
<td>Yes</td>
<td>In continuity with villages, otherwise min. 10000m² on agricultural lands and 20000m² on forest lands</td>
<td>Only in continuity of villages</td>
<td>No</td>
<td>Only in continuity with villages</td>
<td>Only in continuity with villages, over 20000m², otherwise for tourist projects only; with landscape compatibility study</td>
</tr>
<tr>
<td>Large scale projects outside agglomeration</td>
<td>Yes except forest areas</td>
<td>Yes</td>
<td>Only in continuity with villages</td>
<td>No</td>
<td>Ski resorts; only with EIA</td>
<td>Tourist projects; with landscape compatibility study</td>
</tr>
<tr>
<td>Quarries</td>
<td>No</td>
<td>Prohibited in woods. Accepted within a min. distance of 500m away from streams and villages; with EIA</td>
<td>Yes</td>
<td>With an EIA and reclamation of agricultural lands</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Industries</td>
<td>Yes; with pollutions and hazards impact assessment; and study of landscape compatibility</td>
<td>Yes</td>
<td>Only for industries not polluting agricultural soils</td>
<td>No</td>
<td>Only for mineral water industries; with study of landscape compatibility</td>
<td>Only for industries not polluting the agriculture, streams and forests</td>
</tr>
</tbody>
</table>

⁴ The works started in 2004 by the Higher Council for Urban Planning on regulations for non-covered regions have concluded to a regulation proposition coherent with the column A of table 27.

⁵ Compactness of urbanization = continuity of built up area regarding the limits of the existing towns
### Table 28: Recommended regulations for construction, quarries and industrial sites, and infrastructures in natural hazards prone areas

<table>
<thead>
<tr>
<th></th>
<th>Flood Risk</th>
<th>Landslide risk</th>
<th>Extreme vulnerability of water table</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(regulations for lands classified as flood prone areas by NPMPLT and for which no technical study has been carried out proving that the project and its road are safe from any flood hazard and that the project itself does not worsen the situation on the premises)</td>
<td>(regulations for lands classified as landslide prone areas by NPMPLT and for which no technical study has been carried out proving that the project does not present any threat to its future dwellers, nor that it provokes the aggravation of this hazard all around)</td>
<td>(regulations for all lands classified in this category by NPMPLT)</td>
</tr>
<tr>
<td>Urban agglomerations</td>
<td>Expansions accepted only at the edge of existing villages</td>
<td>No particular limitation</td>
<td>No particular limitation</td>
</tr>
<tr>
<td>Density</td>
<td>Very low</td>
<td>Very low, and prohibition on slope &gt; 10%</td>
<td>Average in U and R, low in A and N3, very low in N2, no construction in N1</td>
</tr>
<tr>
<td>Heights</td>
<td>G+1 including eventual floor on piles</td>
<td>No construction in N1 G+1 including eventual floor on piles in U, R, A, N2 and N3</td>
<td>No particular limitation</td>
</tr>
<tr>
<td>Construction setbacks</td>
<td>80% of the land should stay as garden to help water infiltration</td>
<td>80% of the land should stay as garden</td>
<td>No particular limitation</td>
</tr>
<tr>
<td>Classification of housing parcels</td>
<td>On immediate borders of cities and villages and via a technical analysis that proves absence of flood hazard on the project and the nonexistence of hazard aggravation on the surroundings</td>
<td>In immediate border of cities and villages and via a technical analysis that proves the absence of danger on the project and the nonexistence of hazard aggravation on the surroundings</td>
<td>Conditioned by the execution of appropriate sewage works (total treatment) before construction of any road and building.</td>
</tr>
<tr>
<td>Large scale projects outside agglomeration</td>
<td>No</td>
<td>No</td>
<td>Conditioned by the execution of appropriate sewage works before construction of any road and building.</td>
</tr>
<tr>
<td>Isolated constructions</td>
<td>No</td>
<td>No</td>
<td>Yes in U; Accepted only for certain building types in R, A and N (harmless public infrastructures and agricultural installations)</td>
</tr>
<tr>
<td>Quarries</td>
<td>Prohibited in U, N1 and N2; In A, R and N3, a technical analysis proving the absence of flood hazard on the project and the nonexistence of hazard aggravation on the surroundings.</td>
<td>Prohibited in U, N1 and N2; In A, R and N3, a technical analysis proving the absence of danger on site and the nonexistence of landslide hazard aggravation on the surroundings.</td>
<td>Prohibited in U, N1 and N2; In A, R and N3, conditioned by a technical analysis proving the absence of rocky blocks destabilization risks that could induce groundwater system deregulations.</td>
</tr>
<tr>
<td>Industries</td>
<td>Accepted only for industries that do not release toxic and dangerous chemicals that could be spread into the ground in case of floods</td>
<td>Prohibited for all categories</td>
<td>Accepted only for industries that do not release chemicals and solid wastes, the degradation of which constitutes a pollution threat</td>
</tr>
<tr>
<td>Public facilities</td>
<td>No</td>
<td>No</td>
<td>Conditioned by the establishment of adequate sewage solutions.</td>
</tr>
</tbody>
</table>
### Table 29: Recommended regulations for construction, quarries and industrial sites in and around distinguished sites

<table>
<thead>
<tr>
<th></th>
<th>Within large landscape perimeter</th>
<th>In picturesque villages</th>
<th>500m around remarkable natural sites (inland and coastal)</th>
<th>In forests</th>
<th>500m around classified historical and archeological sites</th>
<th>500m around groups of traditional built heritage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Urban agglomerations</strong></td>
<td>Required (in continuity of cities and villages)</td>
<td>mandatory</td>
<td>Study of landscape compatibility showing the absence of a negative impact</td>
<td>Study of landscape compatibility showing the absence of a negative impact</td>
<td>Study of landscape compatibility showing the absence of a negative impact</td>
<td>Study of landscape compatibility showing the absence of a negative impact</td>
</tr>
<tr>
<td><strong>Density (Built up surface areas)</strong></td>
<td>Low, except in Relay-Cities</td>
<td>Low, except in Relay-Cities</td>
<td>Nil within a radius of 50m, very low between 50 and 500 (except in U: to adapt according to each case)</td>
<td>Very low if authorized (5%)</td>
<td>Nil outside cities and villages; very low in R, A and N; to adapt according to each case in U</td>
<td>No particular limitation</td>
</tr>
<tr>
<td><strong>Heights</strong></td>
<td>G+1 in flat terrain and max. 5m above natural terrain if slope &gt; 15%, except in Relay-Cities (G+2 and 10m)</td>
<td>G+1 except picturesque Relay-Cities (G+1 or G+2 according to cases)</td>
<td>G+1 except Relay-Cities (G+2 or more according to cases)</td>
<td>G+1 if authorized</td>
<td>G+1 within a radius of 500m in R, A and N, and within a radius of 50m in U; to adapt for each case between 50 and 500m in U</td>
<td>G+2 in R, A and N and within a radius of 50m in U; to adapt for each case between 50 and 500m in U</td>
</tr>
<tr>
<td><strong>Constructions setbacks</strong></td>
<td>No particular limitation</td>
<td>Study of landscape compatibility showing the absence of a negative impact</td>
<td>Minimum 50m from the edge of the sites</td>
<td>No particular limitation</td>
<td>Minimum 50m from the edge of the sites</td>
<td>Study of landscape compatibility showing the absence of a negative impact</td>
</tr>
<tr>
<td><strong>Classification of housing parcels</strong></td>
<td>Submitted to landscape impact assessment study</td>
<td>Submitted to picturesque character impact assessment study</td>
<td>To avoid</td>
<td>No</td>
<td>Submitted to analysis showing no negative impact</td>
<td>Submitted to analysis showing no negative impact</td>
</tr>
<tr>
<td><strong>Large scale projects</strong></td>
<td>Submitted to landscape impact assessment study</td>
<td>Submitted to picturesque character impact assessment study</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Within a radius of 100m, visual impact assessment study required</td>
</tr>
<tr>
<td><strong>Isolated parcel construction</strong></td>
<td>No except in immediate continuity of villages</td>
<td>Submitted to compatibility study</td>
<td>Study of landscape insertion showing the absence of a negative impact</td>
<td>No</td>
<td>Study of landscape insertion showing the absence of a negative impact</td>
<td>Submitted to compatibility study</td>
</tr>
<tr>
<td><strong>Quarries</strong></td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td><strong>Industries</strong></td>
<td>Submitted to landscape compatibility study</td>
<td>Only harmless activities</td>
<td>No</td>
<td>No</td>
<td>Only harmless activities</td>
<td>Only harmless activities</td>
</tr>
</tbody>
</table>
VI

THE FIRST IMPLEMENTATION PHASE OF THE NPPLT
CHAPTER VI
THE FIRST IMPLEMENTATION PHASE OF THE NPMPTL

What measures should be taken to start implementing the National Physical Master Plan? What are the main concerned administrations? What is expected from each of them in the immediate and medium terms?

Answers to the above questions are given in the present chapter.

In order to be perfectly functional and assist the concerned ministries or public establishments to easily identify their relevant work, the actions proposed in this Chapter are listed by sector.

These actions are of various types. They concern:

- **Large scale projects**, which should be given priority in order to achieve the proposed development strategy;

- **Planning works**, which should be carried out at different scales;

- **Legal propositions** capable of assuring better control of urban development and equilibrium of land use and regional development; and

- **Institutional propositions** which are oriented towards the above mentioned objectives.
VI.1 TRANSPORTATION

Budget priorities:

The expenditures allocated to transportation should be re-evaluated in order to give priority to three types of interventions:

- Maintenance and rehabilitation of the national road network;
- Execution of necessary projects to avoid traffic jams in the Central Urban Area (CUA); and
- Execution of road projects to comfort traffic in the capital of the North (Tripoli), as well as in poles of the East (Zahle-Chtaura) and the South (Nabatiyeh).

The acknowledgment of these priorities should help to postpone new road projects that are out of these categories, at least until the time when the national network is judged satisfactory and the major traffic problems are adequately solved. It leads also to postponing expenditures on the Port and the Airport of Beirut, and to moderate expenditures on fishing harbors.

Priority projects:

Priority projects for the existing network are the following:

- Rehabilitation and maintenance works that should cover the entire national network on the basis of a systematic program of works handling major deficits and improving the entire network to an acceptable level. The financial envelope allocated to these works should consequently be increased, even if this leads to the reduction of the budgets of less urgent new works.

- Release, reconstitution and preservation of the old railway lines for future use as inter-urban rail lines. This constitutes a strategic option, which should be readied for as soon as possible. The longer the delay, the more difficult it will be to recover the old railway lines.

The priority projects required to solve the traffic problems in the Central Urban Area are:

- Turning the old railroad between Beirut and Antelias into a closed corridor, as a first stage, for public bus transports serving specifically Beirut and the upper regions of Matn;
- The construction of a new coastal road between Bourj Hammoud and Antelias;
- The widening of the coastal road crossing Zouq and Jounieh; and
- The project of the Arab expressway between Laylakeh and Aaley.

The priority projects of Tripoli and the other poles are:

- Upgrading of the Port of Tripoli, the road section of the North highway between Tripoli and Halba, and operation of the railroad between Tripoli and the Syrian network;
- Execution of the section of the Arab expressway crossing Ch'taura, including solving the traffic problem of the Ch'taura-Zahle-Damascus crossroads, and the improvement of the Zahle-Baalbeck connection through Nabi Chite and Britel (new connection);
- Rehabilitation of the roads around Nabatiyeh, especially upgrading the link with Marjaayoun and Hasbaya on one hand, and Chehabiye on the other hand.

Protection of investments

The Ministry of Transport, in coordination with the Ministry of Interior, should be more strict vis-à-vis the suppression of illegal practices along the highways, namely the private openings executed for private commerce or private access.

A special vigilance in monitoring is needed in this field, all along the South highway, on the Zahrani – Nabatiyeh expressway, along the North highway between Antelias and Dbayeh, and between Jounieh and the northern border with Syria.

The same should be applied on new highway sections that will be executed along the Beirut-Damascus axis.

Regulation of public transport

Regulation of public transport should be done with the strategic objective of developing medium and high capacity buses in order to reduce road traffic problems, especially along the inter-urban axes. This policy implies taking measures for progressively shifting the activity of small cars towards the taxi practice (point to point trajectory), and towards the absorption of the so-called “taxi-service” (random multiple stop trajectory) until its final prohibition on the highway. This could require progressive repurchase of small cars licenses, as soon as they are on the market.

Organizing authority

The establishment of a transport organizing authority on the entire Central Urban Areas (from Nahr Ibrahim to Nahr Damour) is important in order to reach the objective of NPMPLT in the region. This authority should be competent to handle the entire public means of transport and one part of the road network to be accurately
defined (expressways and large axes). It would be alone responsible for planning of new works, rehabilitation and maintenance, traffic signs, and the regulation and pricing of public transports.

**VI.2 TOURISM**

The Ministry of Tourism could contribute towards a balanced national land management by defining clearly its geographic and sectoral priorities, in accordance with the following:

- Coordinate with the municipalities of Tripoli, Baalbeck and Tyre to implement a promotion policy for these three cities encouraging investors in the hotel sector and to elaborate a regional tourist development plan.

- Cooperate with the Ministry of Transport and municipalities to improve the road and tourism signage system all over the country.

- Conceive, with the help of tour-operators, tourist products (tours, organized trips, etc.) in the North, East and South regions of the country and promote them to potential clienteles.

- Establish a policy of classifying rural dwellings (summer holiday room-renting inhabitant) and promote seasonal renting in the regions.

- Allocate to cultural tourism, rural tourism and eco-tourism a privileged attention compared to other forms of tourism (luxury tourism) that are more attractive these days and need less promotion efforts.

- Contribute to the reinstatement of seaside tourism, and support appropriate free public beach sites for mass tourism (Tyre and similar examples).

**VI.3 INDUSTRY**

The priorities of the Ministry of Industry logically pivot around the reduction of production cost as well as on promotion of exports. Other policies are important to implement in order to encourage the industry, organize it in a better way and make it contribute to the economic boom of the regions.

- The reduction of the energy cost is a crucial objective for the industry. The Ministry of Industry should work hard to accelerate supply of natural gas to the power generation plants, starting with Deir Amar plant, and to condense, on the long term, energy production in the gas operated plants.

- The interest of the industry requires also the availability on the market of reasonably-priced, accessible and well-equipped industrial lands. The National Physical Master Plan recommends the development of 3 industrial zones of national interest, north of Tripoli, towards Rayak and at Zahrani. These
projects should be studied and executed. They should also benefit from a promotion policy to encourage investors.

- The Ministry of Industry is responsible for health and safety norms. It should grant a higher attention to major hazards (explosions, fires, chemical pollution, etc.) in residential areas, such as in some suburbs of Beirut.

- Similarly, a special attention should be given to groundwater pollution hazards from industries established in unsuitable locations. The Ministry of Industry could cooperate, on this issue, with the Ministry of Energy and Water (MoEW), the Ministry of Environment (MoE) and the Directorate General of Urban Planning (DGUP) to elaborate special regulations using the maps of the National Physical Master Plan.

## VI.4 AGRICULTURE

The Ministry of Agriculture has an essential role to play in land management. Its contribution could be reinforced through the following orientations and actions:

- Promote to decision-makers, municipalities and farmers the notion of “agricultural domain of national interest”, highlighted by the National Physical Master Plan, using soil suitability analyses. This awareness is necessary to preserve on the long term the agricultural assets of Lebanon.

- Coordinate efforts with the DGUP to establish the regulations for preservation of this national agricultural wealth.

- Follow-up with the Water Establishments the ongoing irrigation projects, while coordinating with the DGUP to protect the lands concerned by these projects against non-agricultural uses and to secure the permanence of heavy investments.

- Improve the production lines, and work to reduce the costs and increase the quality of productions.

- Help provide adequate water irrigation systems adapted to the most fragile soils, especially in Hermel and the valley of Aassi.

- Support the municipalities in establishing proper management plans for grazing and forest areas, especially in the desertification, landslide and erosion prone regions.

- Implement actions of interest to agriculture, livestock farming and forest proposed by the National Physical Master Plan for combating desertification.
- Launch and support innovative projects for encouraging agro-industry, including freshwater and marine aquaculture experiments in the North (Akkar).

- Promote, in close links with the MoE, the notion of “natural domain of national interest” highlighted by the National Physical Master Plan, which includes among others the projects of “Cedars and mountain trees corridor” and “Green valleys and links”.

- Undertake reforestation campaigns in the framework of the “cedars corridor” project and other reforestation projects.

- Organize, manage, protect and exploit the forests and other green areas, in collaboration with the relevant authorities (municipalities, waqfs, private sector, etc.); promote the exploitation of forest by-products other than wood; and participate in the management of protected areas.

- Participate in the elaboration and the implementation of the Mountain Law.

**VI.5 EDUCATION**

The main orientations that contribute to the land management policy in the field of education, are:

- Reorientation of government policy in providing school seats in the public education sector as well as in technical and professional education: reinstatement of the decree fixing the minimum number of students per school at 75; and limiting the new offer only for regions where public education is demanded and for regions where present schools are in poor conditions, rented or inadequate.

- Reorientation of government policy for new schools in technical and professional post-baccalaureate education, following the same logic.

- Evaluation of the Lebanese University’s new sites, based on the recommendations of the National Physical Master Plan, namely 4 major campuses: Hadath, Tripoli, Zahle and Nabatiyeh, by regrouping the branches of a same faculty on one site, and distributing the faculties on the 4 sites.

- Rehabilitation of the school map as a main tool for the projection of the number of students, the geographic areas to be served and planning for new schools.

- Clarification of complementarities that should exist between the public and private education sectors: in the current state of public finances, and as long as the Government succeeds in having the private sector implement its national education orientations, the public sector should not be in competition with the
private offer, but instead it should provide high quality education services for the regions and social categories deprived of private education.
VI.6 ATTRACTION OF INVESTMENTS

The priority measures to be adopted for this sector concern the following points:

- Creation of 3 agencies for promoting and encouraging investors to establish themselves in the large growth centers, namely Tripoli, Zahle and Nabatiyeh. These agencies could be created within IDAL development agency or as ad hoc missions associating IDAL to the Chambers of Commerce and professional groups and municipalities.

- These 3 “development agencies” should produce communication media for investment opportunities in development projects inspired from the National Physical Master Plan. They are supposed to highlight all measures of support and encouragement foreseen by Law of August 16, 2001 related to the development of investments.

- A retrospective benefit to cost evaluation by IDAL should be carried out of the various measures and operations applied on investments that benefited from important derogations of the construction mechanisms or the occupation of the public maritime domain. The objective of this evaluation would be to determine the proportional benefits of Lebanon from these projects/investments versus the impacts on the non-renewable resources.

VI.7 ENVIRONMENT

The Ministry of Environment (MoE) is highly concerned by the land management policy, due to its influence on the use of, and the negative impact on natural resources.

Hence the contribution of this Ministry would be essential for establishing the land management strategy.

The guidelines that could be the most efficient, at a first stage, would be the following:

- Launching the important project of “Cedars and mountain tree cultivation corridor” by the MoE in collaboration with the Ministry of Agriculture. It is an important program for reforestation and for integrated management of the strip between elevations 1,500 and 1,900m.

- Collaboration between the Ministries of Agriculture and of Tourism with the DGUP for the preparation of a framework law for the mountains, defining the management of all areas located above 1,000 m elevation in 3 brackets: 1,000 to 1,500 m; 1,500 to 1,900 m; and above 1,900 m.
- Collaboration between the Ministry of Agriculture and the DGUP for the preparation of a Law on “regional natural parks”. The National Physical Master Plan has identified 6 potential sites, namely Qadisha, Jaouz, Ibrahim, Ras el-Matn, Barouk-Bisri and Naqoura.

- Supporting the emergence, at a first stage, of the “regional natural parks”, on the sites for which preparatory work is advanced as well as for Naqoura, which should be properly managed ahead of the encroachment of the urban pressure.

- Collaboration between the Ministry of Agriculture and the DGUP to launch the project of the national natural park of North-Lebanon. This would require a prior assessment of the fauna and flora resources, as well as the geological and hydrological wealth of this area. This project requires also consultation with, and support of, local stakeholders.

- Establishing, in collaboration with the Ministry of Agriculture, a framework law on the protected areas in Lebanon, introducing a distinction between the notions of protected sites, protected reserves, national parks and regional parks. This Law should also define the notions of confined and wide perimeters of preservation.

- Launching an inventory work for the identification of natural sites to be protected (grottos, cliffs, fossil deposits, natural bridges, valuable geological formations, wetlands, etc.). The National Physical Master Plan has located a series of sites of these types. The MoE has also undertaken such a project for some categories of these sites. These studies should be completed and each site should be analyzed, identifying protective measures to be taken for its preservation.

- Launching a new land-use mapping. The MoE, in collaboration with the Ministry of Agriculture, produced the first national map of this type in 2002, using 1998 satellite images. This type of work should be repeated every 5 years on average.

### VI.8 POWER

For the sector of power, the priority measures recommended by the National Physical Master Plan are the following:

- Give absolute priority to the transmission of gas to the Deir Amar power plant.

- The next priority project concerns improving the security of power supply through the inter-connection of Lebanese and Syrian networks.
- Launch a strategic vision on the power production plants in Lebanon, with the objective of reducing their number, thus contributing to the decrease in production costs.

- Combine this vision with a medium term plan for increasing production capacities and rehabilitation of some plants. In this matter, the National Physical Master Plan recommends, very clearly, to close systematically the inappropriate plants (starting from Zouq) and to concentrate the investments on 2 or 3 priority sites, especially Deir Amar.

- Redefine the investment program in the North, by renouncing to the Selaata plant (the environment of which should be preserved) and by concentrating on Deir Amar and the old refinery site.

- Launch an experimental program for wind power generation in Akkar, and another one for the promotion of solar energy in northern Beqaa.

- Act vigorously for “disconnecting” the social policy of the Government from the energy distribution service: if a support is to be envisaged for vulnerable groups of people, this should be carried out through social assistance from the Government and not through exonerations – in terms of dues or capacity – from paying the bills of the electricity company. EDL’s balance of accounts is a crucial element for reducing the energy bill paid by the economic actors, and hence for competitiveness. When a group of people is incapable of paying its electric bills (case of certain districts of totally deprived populations), it is the duty of the Government to decide – according to its social policy – to pay these bills on their behalf.
VI.9 WATER AND SEWAGE

The priorities in this sector are presented as follows:

- It is appropriate first of all to better control the water resources, and this requires a better knowledge of the water balance and of the water quantities extracted and used by public and private actors. This requires a campaign for measuring and studying the water resources. The pertinence of planning the investments and management of this sector depends on these actions.

- Concerning the increase in distributed quantities to domestic and commercial use that should constitute the first priority of this sector, it would be appropriate to concentrate on modernization of and reducing leakage rates from water distribution networks rather than increasing the volume of mobilized resources as is the case in general. Every new investment is considered lost by half since unaccounted-for water is as high as 50%.

- Establish, within each Water Authority, a plan to close all illegal water wells, concurrently with the achievement of satisfactory water supply.

- Carry out the necessary measures in order to “disconnect”, like in the case of power, the social policy of the Government from the water distribution service. If a support is to be envisaged for deprived groups of people, this should be carried out through social assistance from the Government, rather than through exonerations – in terms of dues or capacity – from payment of actual service bills. However, this disconnection could take-place only when the service reaches an acceptable level and the management services regain the consumers’ trust.

- As for the water storage dams, the short and medium term plans would not allow constructing more than what has already been contracted out, namely Chabrouh and Aassi. Later, the priority dam projects would be those of Noura Tahta, Bared, Iaal, Younine, Massa, Bisri, Damour and Ibl Saqi.

- Concerning irrigation projects, it is appropriate to complete what has already been engaged, especially the Conveyor 800 for South Lebanon, through designing the distribution networks, accelerating the cadastral coverage of the concerned area, and establishing the regulation that preserves the agricultural character of the irrigated lands. The same should apply to Aassi, Noura Tahta and Hasbani.

- For wastewater treatment plants, the priorities should be directed towards the regions where wastewater threatens groundwater resources. According to preliminary analyses carried out within the framework of the National Physical Master Plan, this should concern, most off all, the cities and the regions of Saghbine-Joub Jannine, Qaraoun, Hrajel, Zahle, Jbrawey, Bent Jbayl, Mishmish and Bakhaoun. As a second stage, action should be
concentrated on Hasroun, Besharreh, Khenshara, Jbaa, Laboueh, Mazraat ech-Chouf, Qartaba, Anjar, Amioun, Chaqra and Hermel. The projects of Tyre, Tabarja, Daoura, El-Aabdeh and Ghadir should be considered only as a third stage.

- As for the sewage system in the large cities where wastewater treatment is not a priority, the efforts should concentrate on rehabilitation of the sewage networks, where it is deemed necessary.

**VI.10 SOLID WASTE**

The rational management of wastes in Lebanon faces three obstacles: institutional (distribution of responsibilities between the ministries of Interior and Environment, and the municipalities), financial (the municipalities do not have the necessary funds to finance this sector) and social (the location of the dump sites and treatment plants is rejected by the municipalities planned to receive them).

Hence, the priority for the Government should be to eliminate these obstacles. The National Physical Master Plan recommends the following initiatives on the short term:

- Proceed to the definition of responsibilities on the basis of a clear decentralization of waste management to groups of municipalities that could be the existing Federations of Municipalities or other new groups to be responsible only for waste management.

- Make sure the created groups of municipalities have the necessary resources to face this problem. The ideal solution consists of attributing to the municipalities’ domestic waste taxes and their collection, and adding therein a Government share to poor municipalities in order to balance inequalities of resources.

- Fix to the municipalities, thereafter, a plan showing the expected objectives and the schedule of implementation. The non-satisfaction of these objectives could be sanctioned by decreasing the Government contribution, which will push municipalities to increase their tax, and manage their own finances.

- Give the MoE the prerogative to contest the locations of landfills decided by the municipalities based on environmental impact assessment if sites were judged unacceptable for public health considerations (impact on water resources, agriculture, fishing, etc.).

- Foresee financial compensations that groups of municipalities would pay annually (for example per ton) to the municipality that would accept the construction of a landfill or a treatment plant within its jurisdiction area.
Until these reforms are implemented, ongoing projects, listed on the CDR program, would have to continue. They concern Hbeline, Hermel-Baalback, and projects for Akkar, Tripoli-Zghorta, Besharreh-Koura-Batroun, Tyre-Bent Jbayl, Nabatiyeh-Hasbaya-Marjaayoun, West Beqaa-Rachaya, Saida, Tripoli and Zahle. Looking for solutions to the saturated landfill of Greater Beirut should continue as well. But it is unlikely that these projects will be executed in the coming 5 to 10 years. Only sizeable reform of the abovementioned competences and funds could solve the conflicts around this issue and give sustainable results.

The Government should also solve the problem of hospital and industrial wastes. It is the duty of the MoE to establish the regulations of these 2 issues, in cooperation with the Ministry of Public Health for hospital wastes and the Ministry of Industry for industrial wastes.

**VI.11 HEALTH**

Within the context of the land use plan, the expected initiatives of the Government in the health care sector are the following:

- The health sector requires major efforts in balancing supply and demand of health services. The establishment of a health plan map is a necessity for the regulation of the supply in the regions (hospitals, health care centers, dispensaries), but also technical plateaus (number of beds for short, medium and long stay, medical and para-medical staff, etc.).

- Health care services should not be conceived only in the framework of hospital structures and health care centers: home hospitalization and ambulatory health care formulas constitute lower cost alternative solutions that should be encouraged and established.

- It will be appropriate, according to an accurate evaluation of needs, to establish an expected balance between public and private offers. In the current situation of public finances and the fact that health care cost is being paid by the user himself and by the relevant social funds equally to the private and public sectors, the public sector should refrain from creating an offer wherever the private offer is already satisfactory.

The problems of improving quality of health care services in all regions, the control of health care expense, the access of deprived people to health care and the progress to be made in the field of preventive medicine are certainly the most important aspects of the health sector, but they have not been considered since they do not have a direct relation with land use planning.
VI.12 ADMINISTRATIVE, LOCAL DEMOCRACY AND THE TAX SYSTEM

The objectives of national cohesion, complementarities between regions and reasonable management of resources often face facts that result from administrative divisions of the territory and democratic territorial representation rules.

Hence, the National Physical Master Plan recommends debating the following issues and reforms:

- The suitability between the territorial representation system and the distribution of the total number of population: the elections by district are carried out in Lebanon based on the official registration of the electors in their home town origin and not their actual residence. In the large agglomerations, often the majority of the resident populations do not participate in the election of those that influence their daily life. In rural zones, permanent residents are submitted to the choice of representatives imposed by non-residents that are often more than the residents. This issue deserves a serious reflection, especially in a highly urbanized country like Lebanon.

- The suitability between the territorial realities and administrative divisions: the agglomerations of Beirut and Tripoli encroach on numerous Cazas, creating thus a double inconsistency. On one hand, the Cazas become composite units containing a suburb of a large city that “operates” with this city – located in another Caza – and less with its hinterland; and a rural hinterland that does not operate with the mentioned suburb (which belongs to its Caza), but instead, with the city located in the other Caza. On the other hand, the 10 larger agglomerations of Lebanon are deprived from united authorities (over the central city and the suburbs) capable of solving the problems in a global vision (for example, transport in the Greater Beirut region, or wastes in the region of Tripoli or Saida). Therefore, a reflection on the pertinence of the Cazas, and on the means to create agglomeration authorities is crucial.

- The suitability between the local tax system and municipal expenses: the municipal authorities lack the means to face the numerous responsibilities conferred to them by the law. The local development is highly obstructed by this condition. The decentralization issue provides the best opportunity to profoundly review the Lebanese local fiscal law.
VI.13 FINANCES AND CADAESTRE

The recommended actions within the competence of the Ministry of Finance concern:

- The cadastral coverage of Lebanon; it should be absolutely completed as soon as possible. It represents first a tool that facilitates the property registration procedures for citizens, and help establishing the land use regulations for territories with high urban pressure, or for zones that are concerned by public irrigation projects or expropriations for road and other projects. Moreover, the lack of land registry (cadastre) in some regions provokes illegal practices of appropriation of other peoples’ properties, public domains or Meshaas. It is therefore an important measure for many aspects.

- The reform of local finances, in order to allow the municipalities to assume correctly their responsibilities that are crucial for local development, the life condition of every person and the environment.

- The reform of fiscal property, the proceeds of which should go to the municipalities. Concerning the urban planning, the priority measure should consist of introducing a “legal ceiling density”, which is a threshold of the construction coefficient beyond which the construction is highly taxed (at the cost of land required to build legally within the threshold). The ceiling could be fixed by a percentage of the authorized construction area coefficients in each zone (e.g. payment is done starting from 80% of the authorized coefficient), this percentage being lower for regions with no local urban planning (e.g. 50%). The proceeds of this tax should be affected by the municipalities to the extension of road networks and equipping new zones with infrastructure and public buildings. The idea behind this measure is to affect one part of the land-improvement added value, due to the situation of the land, to public effort necessary to accommodate the expansion of constructions.

VI.14 URBAN PLANNING

The measures to be taken in this sector are numerous and diverse, due to the strong interaction between land management and urban planning.

Legislative and legal reforms

The legislative and legal reforms to be launched as of the publication of the National Physical Master Plan should concern a series of problems highlighted by this Plan:

- The construction regulations in the regions that have no local urban planning (80% to 90% of the territory): the current system that allows the construction of 4 levels with a coefficient of construction of 0.8 to 0.9 in all these regions is not only harmful for sensitive areas (natural or agricultural) but leads also to strong local opposition every time a local urban plan is envisaged. This
condition obstructs the process of urban planning throughout the country, except within the perimeter of large cities (where it is rare to envisage a decrease in coefficient). It is vital for Lebanon to reform this situation by reversing it: the building rights should be the lower possible as long as a local urban plan is not approved.

- The possibilities of housing estate development in regions that do not have local urban plan: these possibilities should be severely restricted when the projects are not located in the direct continuity with built up areas of cities and villages. A real estate project located away from inhabited zones should not be authorized if it is not equipped with a road, potable water supply, sewerage network and electrical network. Even if these conditions are satisfied, the project should be submitted to an environmental impact assessment, and its authorization should be conditioned by the construction of the infrastructure, at the expenses of the project developer and prior to any building permit. Finally, the more the project is distant from inhabited areas, the larger the surface area of the new lots should be and the construction area coefficients reduced.

- The anticipation, in the local urban plan, of future housing estate projects: when a local urban plan is being elaborated or reviewed, it is necessary to preserve the area for a main road that would serve all possible future extension districts. The housing estate projects should respect these road alignments.

- A legal framework for the mountain: with the coordination of the Ministry of Environment, the Ministry of Agriculture and the Ministry of Tourism, the Directorate General of Urban Planning (DGUP) should work towards the conception of a legal framework defining the principles of land use in the mountain, according to 3 ranges of elevation: from 1,000 to 1,500m; 1,500 to 1,900m; and above 1,900m.

- A legal framework for the coastal zone and the water streams: the protection dispositions of the current legislation seem insufficient to protect the public domain and preserve the quality of the water, the shores and the river banks. A complementary legislative effort should allow modernizing the concepts and give solutions to the new practices and threats against the coastline and the water streams.

- The introduction to the Law of Urban Planning and Law of Construction new dispositions concerning natural flood and landslide hazards.

- The participation with the MoE in the elaboration of new legal framework concerning the protection of the natural wealth (localized natural sites with restricted and large perimeters, protected forest areas, natural reserves, regional natural parks, national parks, etc.).
In general, the DGUP will have to engage an important juridical and legal project on the basis of the dispositions recommended by the National Physical Master Plan. This project should be carried out methodically and financed up to the extent and value it represents to the Administration.

Urban planning operations

The National Physical Master Plan recommends launching, at the initiative of the Government, a series of urban planning operations, the juridical form of which is to be defined according to the objectives and the context of each of them.

- In the short term, it is important to achieve the operations already started, namely the Beirut Central District and Elyssar projects.

- A third operation seems to be determinant in the short term which is the “southern terraces” of the Caza of Aaley that covers the zone between Khaldeh and Damour. This area seems to be an obligatory extension area for the agglomeration of Beirut towards the South. It is important to equip this area with adequate road network and infrastructures, allowing a coherent urban planning, which is not currently the case, due to the configuration of the authorized housing estates, the lack of infrastructures, the illegal connections to the highway, etc. It is important, at the same time, to plan a smart management of this zone that could highlight the configuration of the site, constituted of western slopes towards the sea. All of this requires land consolidation, infrastructure funding and construction regulation. The infrastructure funding could be secured by a totally new mechanism: some lands would have higher construction area coefficients than the current regulation could assign, but this density increase would be payed at the price of the land surface area that would be necessary under the old coefficient. The proceeds of this tax would be paid to the developer in order to execute the infrastructure over the entire zone.

- Later on, or simultaneously, other urban planning operations should be conceived and launched on strategic locations: the vicinities of Nahr Beirut in the close suburb and in the city (new districts to be developed), the northern coastal zone (new road to cross along the coast), the vicinities of Chhaura-Jdita (new district to be created), a site to look for in Nabatiyeh (new district to be created), the northern extension of the Central Urban Area between Maamelteïn and Nahr Ibrahim (similar to Khaldeh-Damour).

Local urban plans

Several local urban plans should be elaborated or reviewed in conformity with the perspectives of the National Physical Master Plan.

The geographic locations where it is appropriate to intervene as a priority (besides the southern and northern extensions of the Central Urban Area, being treated as an urban planning operation) are:
The Nabatiyeh Plan that should take into consideration the status of the “metropolis of balance” proposed for this agglomeration and the perimeter of which should be widened to contain the entire plateau.

The Zahle-Chtaura-Qab Elias that should take into consideration the status of the “metropolis of balance” proposed for this agglomeration, as well as the Arab highway, the will to preserve the agricultural lands and the management operation that should take place in the sector of Chtaura-Jdita.

The Enfe-Chekka Plan, a site where important industries, a site of high environmental value (Ras Chaqaa), many sites with important heritage value (Phoenician wall and Salinas), beaches and landslide and flood hazards are located at the same time.

Beside these local plans to elaborate and implement in accordance with the normal procedures, more specific local plans should be established in priority on certain zones that are threatened by urban linear expansion and scattered invasion of agricultural lands, particularly the following zones:

- Aabde-Halba (including the desire to reserve an important industrial zone in this sector);
- Rayak-Baalbeck (including the desire to reserve an important industrial zone in this sector); and
- Baalbeck-Laboueh.

The DGUP should be present on all potential sites of natural parks as a partner with the promoters of these parks (municipalities, associations, MoE, etc.) to establish together the new regulation that should match with the objectives of each park. This concerns the following regions:

- The triangle Qobeyat-Sir-Jbab el-Homr;
- The valley of Qadisha;
- The valleys of Jaouz and Nahr Ibrahim;
- The valley of the tributaries of Nahr Beirut (Ras el-Matn);
- The valley of Barouk and Bisri; and
- The region between Tyre and the southern border.

An urban development agency

The low level of infrastructure utilities in the new urbanized areas and the alarming linear development of constructions alongside interurban roads between the villages are the consequences of the lack of efficient tools to manage the urban extensions and the offer of lands for construction.
To resolve this problem, it would be necessary, in the situation of Lebanon, to create an “urban development agency” in the form of a commercial autonomous public office.

This agency would have the duty, over the entire territory, to carry out missions for the Government (all administrations that may request the assistance) or the Municipalities, in the following fields:

- Acquisitions of lands in a friendly way;
- Leading the implementation of expropriation procedures;
- Conception and implementation of land consolidation and repackaging;
- Construction of infrastructures on public percellation and urban expansion areas; and
- Resale of lands after their management.

The activity of this agency would aim first at the management of extension zones of the agglomerations.

The operation expenses of the agency should be covered from a share cut from the remunerations of engineering missions as well as from the added value of the lands as a result of the management improvements.

VI.15 CENTRAL SUPPORT TO THE LAND MANAGEMENT

The above-mentioned missions in the various sectors show that land management concerns in essence all the administrations. However, the consistency of the operation should be monitored and managed and a central support should be provided to the various administrations to ensure success.

Two parts are to be distinguished: on one hand, the actions of awareness, capacity building and encouragement, which are logically the responsibilities of the Ministries of Administrative Reform and of Information; and on the other hand, the management and control of the applied policies, which are the responsibility of the Council of Ministers and the CDR.

As far as awareness and capacity building are concerned, the following are proposed:

- The Ministry of Administrative Reform could start a program of capacity building of the civil servants of all the Ministries to make them acquire the basics of land management, so that each one of them takes into consideration the “land management” concept in his day to day work in the Administration.

- The same kind of work must be done at the municipality level. The Ministry of Administrative Reform has taken the initiative of such a task, through the program that has already been launched and with the help of the EU, inciting neighboring municipalities to join their efforts to elaborate a vision for the
development of their territory, compatible with the objectives of the land management.

- At the public level, the Ministry of Administrative Reform and the Ministry of Information could conceive awareness campaigns through the mass media (TV, Radio, written Press), that would cover specific topics directly connected to land management and that could promote new behaviors vis-à-vis the territory. They could also organize various events on relevant issues. They could finally act more specifically towards the teachers who would sensitize the growing generations to respect the land and the behavior of the citizens.

As for the public policies piloting and control mechanism, the followings are proposed:

- The establishment of an “Inter-ministerial Committee for Land management” procedure, which would meet once every year to evaluate the tasks executed (compared to the fixed objectives) and to decide on the projects to be undertaken.

- Taking into consideration its situation and its jurisdictions, the CDR is the only administrative and technical body that assures, within the Government, the coordination of the programs and actions that contribute to the realization of the land management objectives. Therefore, it has to play the central role in the preparation of the duties of the “Inter-ministerial Committee for Land management”, and then the coordination of their implementation.

- The CDR has created, within its Directorate of Programs, a land management department. The latter should make sure that the “Land management program” is included, in every investment program. It should also control closely the public actions (investments, legislations, regulations) conducted by the different administrations, analyze them and suggest the necessary corrections.

- This department will have also to manage the spatial database that have been produced by the National Physical Master Plan, and that are compiled in a “Geographic Information System”. The management of this database should be active and in partnership with those concerned. Besides operating this system for the analyses, it is necessary to update the data continuously and to enhance them. For this purpose, the ideal procedure would consist in creating a network of partners (or a “users’ club”), especially with the DGUP, the MoE and the National Center for Scientific Research – National Center for Remote Sensing (NCRS). Each member of this network would be engaged to improve the information related to his field of work and to store them in the common database.
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THE PROJECT TEAM

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